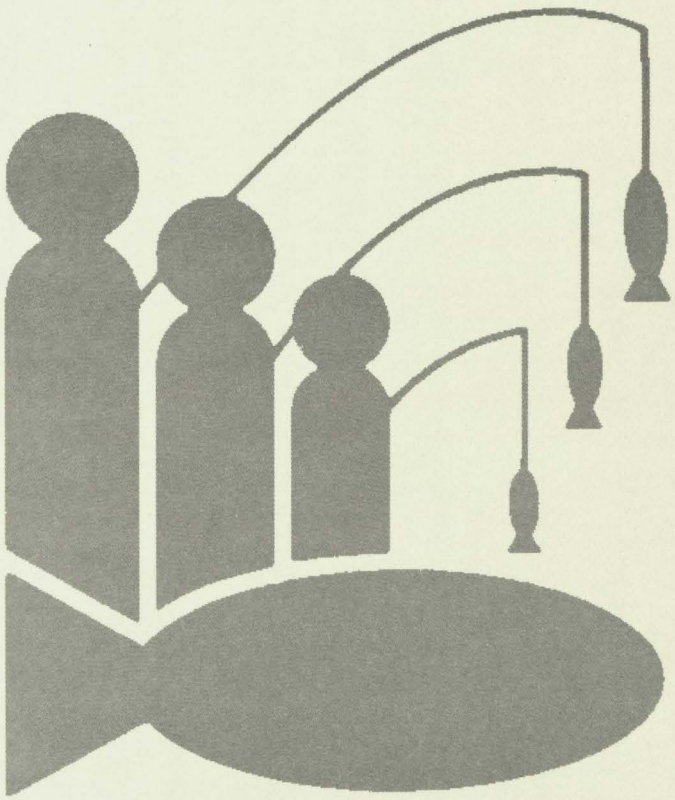
FLORIDA WILDLIFE®

Volume 47, Number 3 May-June 1993

TAKE A FRIEND FISHING



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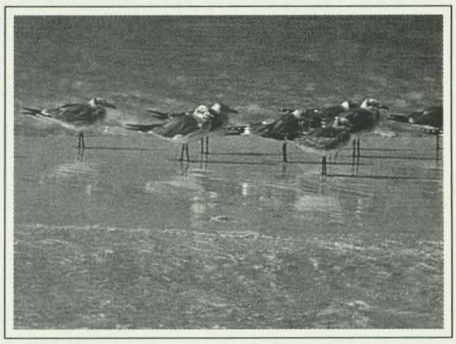

Wildlife Viewing
We begin our series on where to view wildlife in Florida. The first installment, beginning on page 24, features prime viewing spots in west Florida.

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Covers

The watchable wildlife species on our front cover is a least bittern, photographed by Rob Curtis. For the back cover, James Valentine, for the Dolphin Research Center, captured two dolphins in mid-leap.

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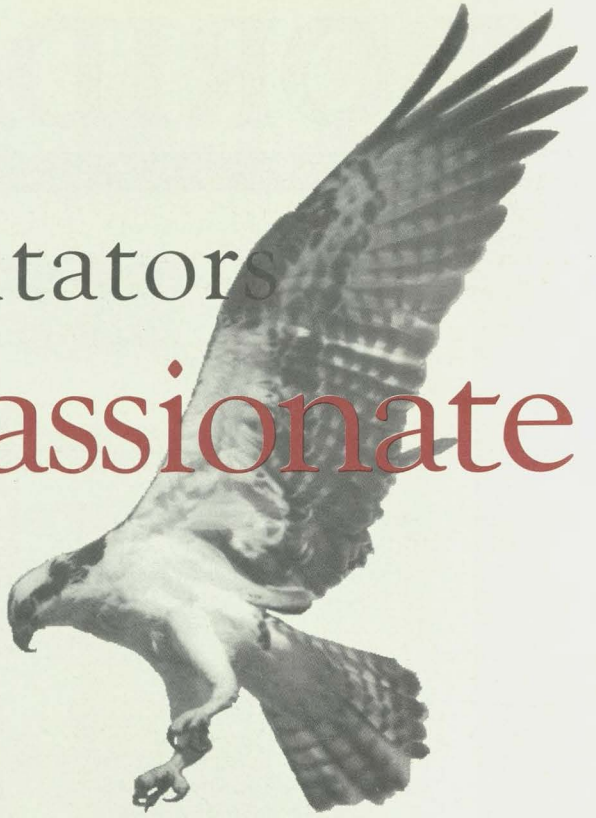
Wildlife Rehabilitators Lend Compassionate Hands

By Henry Cabbage



SANDY BECK

Jon Johnson of St. Francis Wildlife Association prepares to release a recovered osprey at Lake Lafayette.

CHARLIE HEIDECKER

Care and Rebabilitation of Wildlife volunteers net an injured pelican.

The sight of a sick or injured wild animal awakens in most people an overpowering urge to override the law of nature that says only the strong survive. The human heart says the weak must be protected.

The Florida Game and Fresh Water Fish Commission, although generally associated with regulating hunters and fishermen, also sets rules and qualifications for the 275 centers devoted to survival of creatures that would be lost without human intervention. Inspector Kyle Hill, head of the Commission's bureau that enforces regulations governing care of captive wildlife, said the public expects wildlife agencies to protect injured wildlife even though there are no public funds set aside for that purpose.

"We aren't equipped to do it, so we rely on a special group of people who care so much about these animals, they're willing to make the sacrifices it takes to help them," Hill said. "The Commission's role is to make sure these individuals have the skills and facilities to provide the proper services."

Many of Florida's wildlife rehabilitators are in large population centers, but some are in small communities. Most rely on one or more local veterinarians for animal emergency care. Afterward, rehabilitators and volunteers take charge of the animals' convalecence.

"The underlying objective always is to return the animal to the wild, if possible," Hill said.

Sometimes the animal can't be released into the wild because of the nature of its injuries, and that's the source of much heartbreak that goes along with being a wildlife rehabilitator. The animal may have to be euthanized – "put down," they call it – to make room for another animal that can survive.

"In cases involving endangered species, permanently disabled animals can be turned over to government-sponsored breeding colonies," Hill said. "But in other cases the rehabilitator faces the grim prospect of either putting the animal down or retaining the animal as a permanently disabled specimen. Eventually, some rehabilitators may become so overwhelmed with permanently disabled animals that there is no room left to take in injured specimens. We cannot allow this to happen."

LeeAnn White of Lake Wales, former president of the Florida Wildlife Rehabilitation Association, said there is no doubt wildlife rehabilitation is a high-stress calling that leads quickly to burnout. She said caring for suffering and dying animals takes its toll, emotionally and physically, on the people involved.

"Rehabilitators are highly sensitive people to begin with," she said. "If they weren't sensitive, they wouldn't be rehabilitating wildlife in the first place."

This commitment can be as dangerous as it is emotionally taxing. Wild animals can carry all kinds of diseases. White can attest that they don't hesitate to use their claws, teeth, sharp beaks and talons against the people that care for them. She's had more than her share of bites, scratches, puncture wounds and bruises over the years. She recalled one particularly unpleasant encounter with a bird that uses vomit in self-defense.

"I was pregnant at the time, and we had taken in an injured vulture," White said "First he'd get sick on me, and then I'd get sick, and then he'd get sick again, and I'd get sick again. We had quite a contest going on for a while."

Rehabilitators – "rehabbers" for short – must try to keep the animals from getting accustomed to humans. That way, ▷

LARRY HIGDON

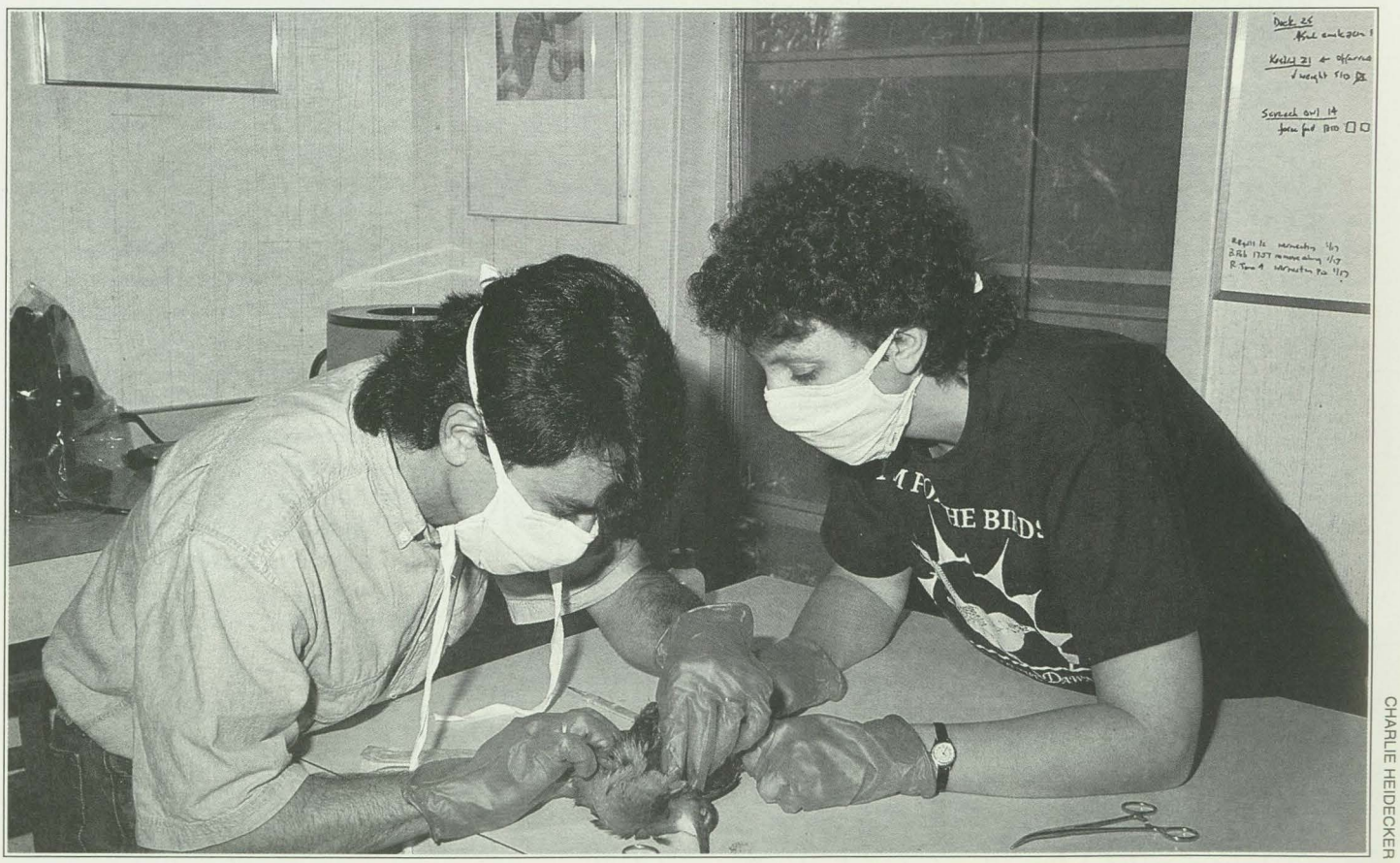
These fox cubs were born prematurely when their mother was trapped.

they avoid human contact and tend to live longer when they are released.

Heidi Higdon, who, with her husband, Larry, volunteers time and resources to help rehabilitator Cindy Westra in the Orlando area, said she has seen many volunteers start out with unrealistic ideas about what chores are involved in wildlife rehabilitation.

"The work is hard, dirty, often heartbreaking and involves forfeiture of a large portion of family and social life," she said. "People come in to volunteer, thinking they'll just have to hang around and hug baby animals and play with the others. Then they find out they have to cut up mice to feed the owls and chop worms for the baby birds. And when they see how much feces there is to clean up after a few dozen wild animals, they don't come back."

If they do come back, they eventually learn that releasing a few hundred animals back into the wild every year doesn't really make that much of a difference to nature's balance.



CHARLIE HEIDECKER

Mark Elis, D.V.M., operates on a rail. Experts say that the first 24 hours are the most critical if an injured animal is to be released.

"Rehabbers know they are merely putting Band-Aids on a great environmental disease," Higdon said. "Wildlife rehabilitation without education renders the whole process ecologically impotent."

The real value of wildlife rehabilitation lies in the opportunities it offers for teaching others about wildlife conservation and the connection between healthy wildlife populations and natural habitats. For that reason, the Higdons co-founded the Save the Wildlife organization to encourage people to preserve natural habitats and to point out alternatives to the environmentally destructive chemicals and devices people use every day.

Save the Wildlife hopes to establish a more effective network among wildlife rehabilitators across the country. Animals fare better in captivity when there are two or more of them together, and the network would serve to keep rehab centers aware of which facilities would be best suited to meet animals' needs.

The Commission usually issues permits only to rehabilitators who agree to take in all types of native wild animals. Occasionally, however, it does authorize some to limit their activities to specific types of animals if the rehabilitator has special skills. For instance, one rehabilitator in Wakulla County specializes in working with bears. Dolphin Research Center in the Florida Keys primarily helps stranded whales and dolphins.

Save a Turtle at Islamorada doesn't rehabilitate turtles, but it helps raise money to fund the sea turtle research and rehabilitation efforts at the Hidden Harbor Marine Environmental Project, at Marathon. Hidden Harbor, operated by Tina Brown and Richie Moretti, has set up what may be the only sea turtle hospital in the world, caring for about 50 patients. The project is struggling to find a cure for fibropapillomas – life-threatening tumors that afflict over half the green sea turtles in Florida and elsewhere.

The Rascals Orphan Care Network, in Broward County, specializes in raising orphaned baby animals. Ellen Rosenberg of Royal Palm Beach focuses on caring for birds. Other rehabbers concentrate on eagles, pelicans or other types of birds.

The Suncoast Seabird Sanctuary, near St. Petersburg, is the largest privately funded bird hospital in the United States. In a typical year, the center treats thousands of herons, pelicans, ibises, spoonbills, egrets, anhingas, doves and cormorants and 60-odd other species that get a second chance to survive.

As with other rehabilitation centers, public education is a major project. The facility offers public tours at 2 p.m. Sundays and Wednesdays, wildlife photography programs on the first Sunday of the month and film and lecture programs for public audiences and schools.

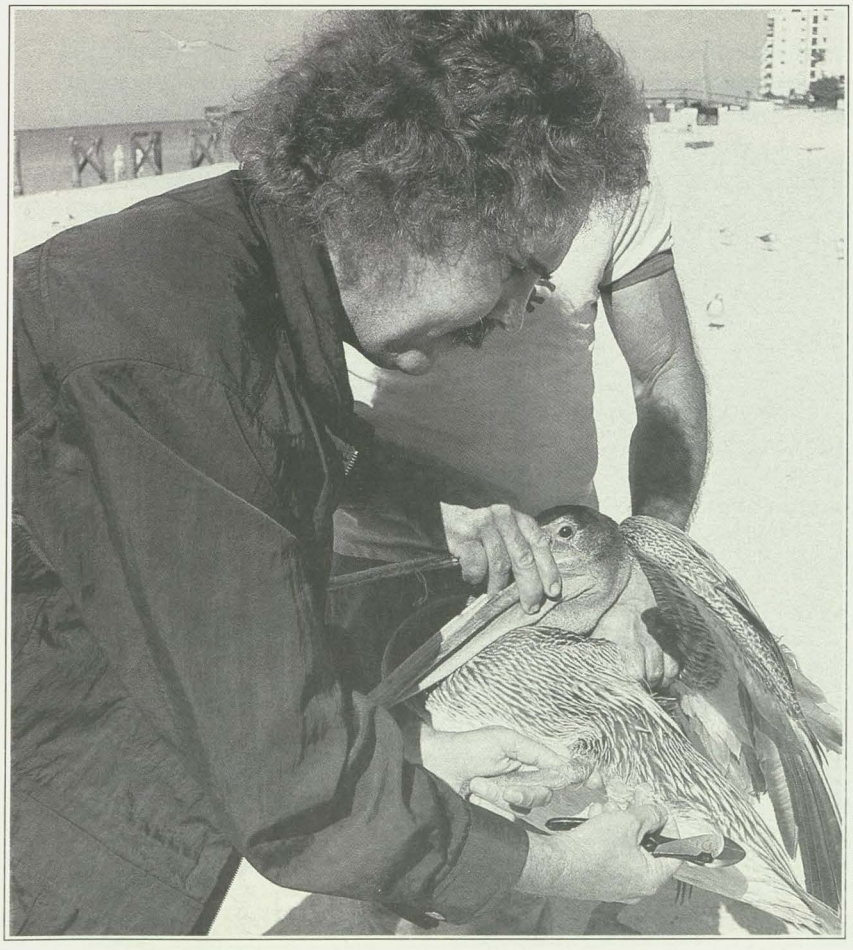
Ralph Heath Jr., who heads the Suncoast facility, said the sanctuary gets about 60 rescue calls per day. It admits about 20 birds daily – half of them brought in by the public.

Dr. Harold Albers, the center's veterinarian, has proved to be an innovative healer. Albers has developed artificial limbs and beaks and has pioneered work in pelican pouch repair and reconstructive surgery for birds that have lost body parts to frostbite or other causes.

Florida's wildlife rehabilitators vary from solitary individuals who care for a few injured songbirds in cages at home to well-organized wildlife hospitals with full-time, paid veterinarians and laboratories.

Through the years, one case of fraud stands out in the minds of the Commission's nine wildlife inspectors who periodically check on rehabilitation centers to make sure the animals are receiving proper care and treatment. This was a case involving a center that claimed to be rehabilitating deer from the Everglades during the die-off in 1982. The operator was raising money that he said would benefit the animals, but he was keeping the captive deer in such a state of neglect that the Commission seized the animals and returned them to the wild.

Wildlife rehabilitators are not allowed to charge a fee for their services, but it is perfectly legal and reasonable for them to conduct fund-raising activities to help offset expenses. It's a rare facility that can't use more money. Most of them need other materials too, such as office supplies, animal feed, bandages, soap and tools. Rehabbers tend to police their own ranks when they find out about questionable ▷



TY AND JULIE HOTCHKISS

Ralph Heath, Suncoast Seabird Sanctuary, removes fishing line from a pelican's leg.

practices by other rehabbers. White remembers one individual who responded to reports of injured animals but, upon arriving on the scene, would announce that he would not be able to help the injured critter unless somebody made a small donation ($25 would be fine, thank you) to cover his expenses.

"With a poor, mangled animal lying there in the road, suffering, people just couldn't say 'No' to him and he knew it," White said. "So they would just give him the money."

Rehabbers told wildlife inspectors about the man's tactics and the officers told him to stop.

Sometimes there's friction among even the most ethical rehabbers too. Turf battles erupt.

Hill said the Commission occasionally gets calls from wildlife rehabilitators who are upset because another rehabber "picked up an animal on our side of town" or "has been fund-raising among some of our supporters." Sometimes the caller even demands that wildlife officers arrest the rival rehabber.

"That kind of dispute can be destructive. Rehabbers typically are extremely compassionate people who feel strongly about the importance of what they do. Still, conflicts are going to happen," Hill said.

Despite the agonies of wildlife rehabilitation, some say it also has a therapeutic effect for the humans. Sarasota's "Pelican Man," Dale Shields believes his commitment to saving injured wildlife has given him the will to survive seven coronary bypasses.

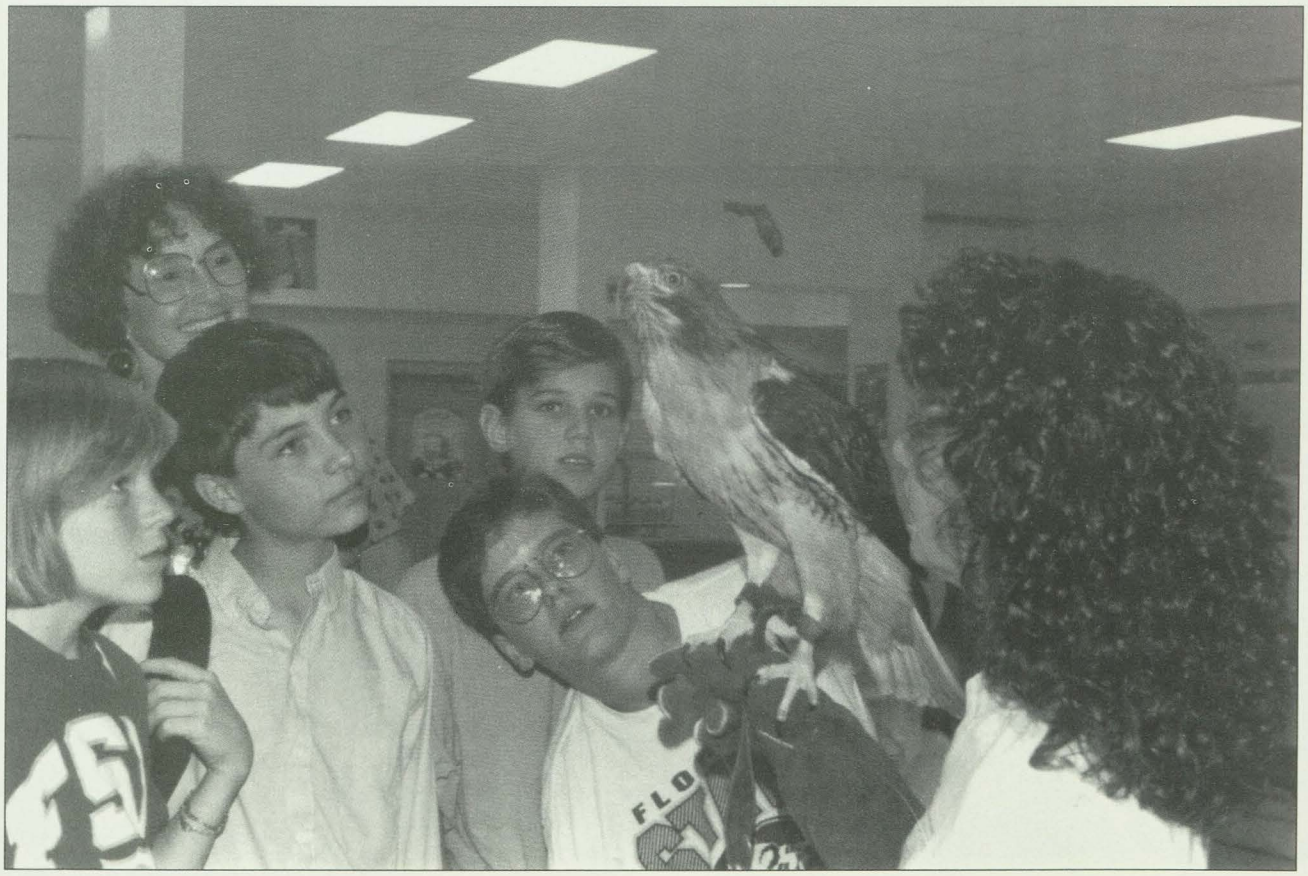
Since he rescued and rehabilitated a nearly dead pelican 12 years ago, Shields founded and has been the motivating force behind an organization that reportedly has rescued 42,000 birds along the southwest Florida Gulf Coast. The organization, Pelican Man's Bird Sanctuary Inc., now boasts 7,200 members worldwide.

Shields said 300 volunteers at Sarasota, 75 at Venice and 11 paid employees at the sanctuary contribute to the organization's high success rate.

Pelican Man's Bird Sanctuary is open to the public and entertains 150,000 visitors per year. There's no charge for admission.

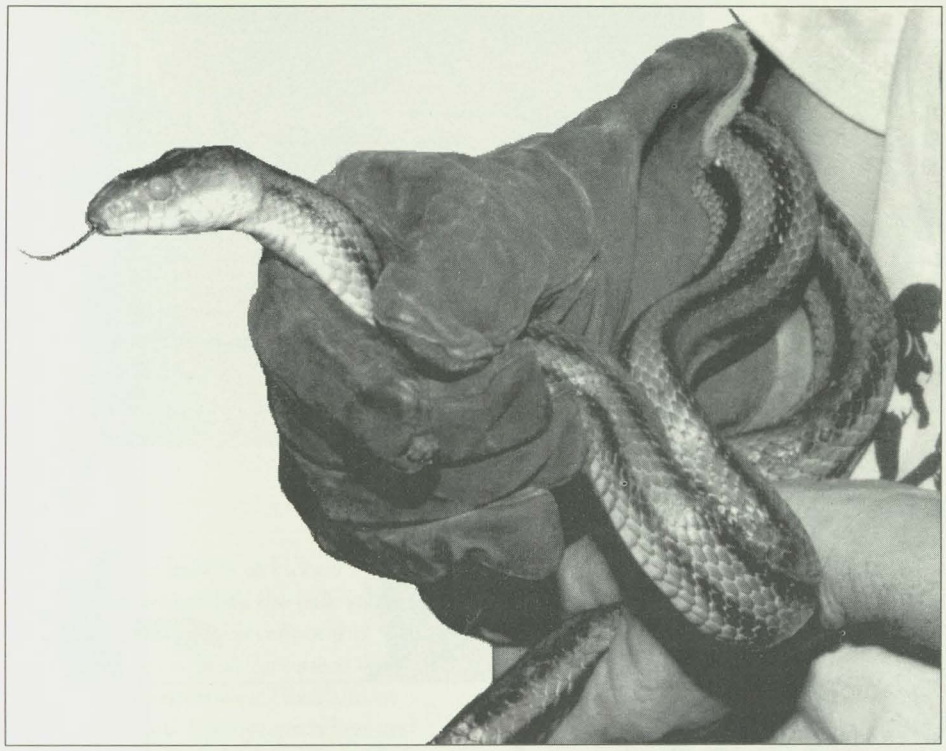
Although many people cannot cope with one emergency after another and all the injured and dying animals rehabilitators encounter, White said she's found that with a little encouragement, most people are willing to help in one way or another. She said, for instance, friends frequently drop by rehabilitation centers with road-killed animals to feed to convalescing carnivores. The Commission doesn't recommend this practice without becoming thoroughly familiar with applicable laws and biological hazards.

"I remember one time when an elderly lady had heard me say during a public speaking engagement that we used fresh road-kills to feed to some of our recovering animals," White said. "And one day she drove up in a great big car, barely able to see over the steering wheel. Then she proudly came up to me and handed me a huge, flattened, dried-out vulture she had found in the road."



LEAH ENNIS

Sandy Beck and red-tailed hawk "Ayla" visit sixth graders at Deerlake Middle School in Tallahassee.



LARRY HIGDON

Rehabilitation centers receive complaints about harmless reptiles. Here, a Save the Wildlife volunteer removes a rat snake.

The offering really was of no use to the rehabilitation center, but White was gracious enough to act like it was.

Ironically, some animal rights organizations, despite their opposition to killing animals, also are opposed to wildlife rehabilitation centers. White recalled a 1984 threat by the Friends of Animals to release all the animals at a central Florida rehabilitation center rather than let them be kept in cages during their recovery. The group never carried out the threat, however.

Sandy Beck, who teaches freshman composition at Tallahassee Community College, works with injured wildlife at the St. Francis Wildlife Association Inc., at Tallahassee. She said she feels a sense of duty to help care for animals that suffer from human encroachment into their habitats. [**Editor's note**: See page 8 for a personal account of her experience.]

"Most of the injuries we see are caused by the animals' interaction with humans," she said. "Sixty percent of wildlife injuries are caused by free-roaming pets. Others are caused by cars, power lines and secondary poisoning. We try to undo some of the damage that's been done."

Beck said that although some rehabbers believe only endangered species should be rehabilitated, others see value in the lives of all creatures, especially if the injuries were caused by humans or man-made contrivances.

Still, there is a strong argument to be made that by not rehabilitating gray squirrels, jays and other abundant species, wildlife rehabilitators can keep space and resources available to help species that are in danger of extinction

Rehabilitating all or a select few is a hotly debated issue. According to some rehabbers, the trend is changing, placing more emphasis on conservation management and sound biological decisions.

Brian Mealey, director of the Falcon Batchelor Bird of Prey Center of the Miami Museum of Science and a respected raptor rehabilitator, believes there should be less emphasis on rehabilitating those abundant species that live in heavily urbanized areas.

"I feel we should concentrate on species that have a greater need for assistance. Because our resources are limited, I prefer to specialize in helping birds of prey."

But Beck is from the school of thought that says rehabbers should try to help all sick and injured wildlife regardless of species.

"What you learn by fixing an opossum's broken leg today may help you fix a bear's broken leg later," she said. "I'd stay up all night with a baby squirrel just as certainly as I would stay up with a rare animal."

Each wildlife rehabilitation center staff has its own stories to tell. All of them have their triumphs and failures – times when the volunteers laughed and times when they wept. The animals never stop coming, and the rehabbers never stop trying to save them.

Persons interested in wildlife rehabilitation should bear in mind that it is a vocation that requires training as well as compassion.

"You should start off by volunteering to help at an existing rehabilitation center," White said.

As Beck put it, "Wildlife rehabilitation is not an exact science; it's an art that you pick up through trial and error."

Rehabbers are required to obtain permits from the Commission, and since many of them deal with migratory birds, duplicate permits are required from the U.S. Fish and Wildlife Service. Permits are not available to anyone under age 18. Caging requirements, animal transportation, records and other procedures are specific and strictly enforced.

Qualified individuals who would like to become wildlife rehabilitators can obtain application materials from the Game and Fresh Water Fish Commission, Division of Law Enforcement, 620 South Meridian St., Tallahassee, FL 32399-1600. For information about the state association, write to Florida Wildlife Rehabilitation Association, Inc., P.O. Box 1418, Anna Maria, FL 34216. For information about permitted rehabilitation centers in your area, contact the closest Commission regional office.

Henry Cabbage is a public information director in the Commission's Tallahassee office. Other than photographers featured, Tina Brown, Heidi Higdon, Wayne Mayhall, Linda Mirabelli, Kyle Stuart and George White contributed to this story.

LEAH ENNIS

Windows On a Wild Soul

By Sandy Beck

I sat on a stool in the corner of her mew, an 8-square-foot, wooden-slat cage. My eyes focused alternately on my sandals and the long branches of the water oak that trailed across the roof in the warm, June breeze. I'd been advised not to look into her eyes, as such directness might imply aggressive intent.

The red-tailed hawk sat defiantly. Powerful feet and 2-inch long, razor-sharp, black talons gripped a pecan branch we had salvaged after a recent storm. Ayla (my husband named her after the heroine in "*Clan of the Cave Bear*") was quite large, even for a female, which is always larger than the male of this species. But her puffed-out brown, tan and white feathers blew her up to an enormous stature. Amber eyes pierced the top of my head, clearly expressing her displeasure. She flinched at each move I made.

What had I gotten myself into – locked into this cage with a wild, frightened and possibly angry one-winged raptor? A hawk can detect the high-pitched distress calls of injured rodents and rabbits; I wondered if this one could hear my heart pound.

She'd been shot by someone who'd mistaken her for a wild turkey, or possibly by a farmer who thought she might steal a chicken (the old "chicken hawk" misnomer) or maybe by someone out of spite. Now, required state and federal permits in hand, I was to be St. Francis Wildlife's new educator, and she was to be our first education bird. After teaching English to junior high school students in Miami, I expected this to be a piece of cake. Just another wild classroom. I hoped.

Each evening while she ate, I sat on my stool and envisioned a white, liquid light soothing and connecting us. Bathed in this warm, summer light, I think we chipped away at the ice. After a month, she trusted me enough to take meat from my gloved hand, but still would not be raised off her perch and carried on my glove.

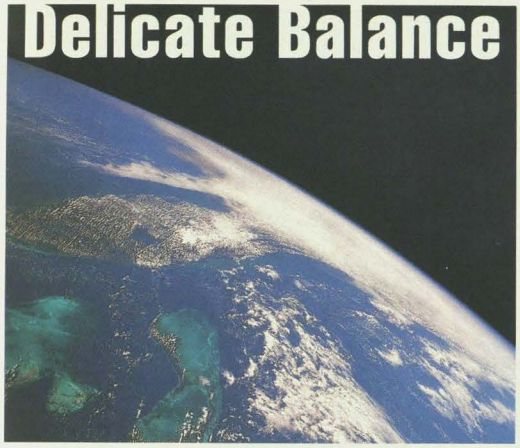
The old falconry books advise that if you can sit through some long, dark or stormy hours together, the hawk may feel that the two of you have endured an ordeal, which will help the bonding process. One evening at feeding time, I approached Ayla just as a big, summer storm began to roll in from the southwest. A thick blanket of clouds covered our Lake Jackson area, suddenly darkening the inside of her mew.

Working with teenagers for 15 years has taught me to seize those magical, teachable moments. So, holding the meat in my left hand, I slowly moved beside the hungry hawk, now calmed by the darkness as if covered by a falconer's hood. I pressed my right, gloved hand against the backs of her legs. Ayla stepped up onto my glove and took a piece of raw meat.

I was flushed with excitement, but forced myself to stand quietly while she gripped my gloved hand with strong, heavy feet and sharp talons. For the first time, I watched as she tore off and swallowed chunks of meat, and the evening rumbled through our bones.

Sandy Beck is curator of education with the St. Francis Wildlife Association, a nonprofit organization in Tallahassee dedicated to the conservation of native wildlife.

Delicate Balance



Species: Orange Azalea (*Rhododendron austrinum*)
Florida Status: Endangered
Federal Status: Not Listed

GRAY BASS

Also known as Florida azalea and wild azalea, the pale yellow to brilliant red-orange blooms of this beautiful native shrub ornament the woodlands of northwest Florida from March to April. Springtime hikers and canoeists may find orange azaleas blooming along the slopes of forested ravines and streambanks of the Panhandle from Leon and Liberty counties westward. This same species also occurs naturally in southwest Georgia, central and south Alabama and southeast Mississippi.

The orange azalea is one of five species of native rhododendrons that occur in Florida. The others are the piedmont azalea (*R. canescens*), Chapman's rhododendron (*R. chapmanii*), swamp honeysuckle (*R. serrulatum*) and Alabama azalea (*R. alabamense*). Few people realize that the evergreen azaleas most commonly planted in southern home landscapes are Asiatic species that have been introduced to this country.

The genus *Rhododendron*, to which azaleas belong, is a member of the *Ericaceae* or heath family. Members of this family typically are plants of acid soils and are common components of Florida's acid swamps and pinelands. Other native species belonging to this family include the fetterbushes, mountain laurel, blueberries and huckleberries.

The orange azalea is a deciduous shrub that eventually may grow to a height of around 20 feet. It is one of the first native azaleas to bloom in the spring, with flowers opening before, or as, the leaves emerge. The trumpet-shaped flowers vary between 1 and 2 inches in length and grow from the tips of the branches in large clusters of 8 to 15 blooms. The tubular portion of the flower is typically clothed with tiny, reddish, glandular hairs. Similar vesture also may be found on the leaves and branches.

Azalea flowers are sometimes fragrant and vary widely in color – from pale yellow to red-orange. Gradations in flower color and form are likely the result of natural hybridization between the orange and the piedmont azaleas. The flowers of the piedmont azalea, as well as the other three species of native azaleas, tend to be white to pink in color. Positive identification of individual species may be complicated, however, since they hybridize so readily in nature.

The orange azalea is one of several native plant species favored by gardeners for use in woodland landscapes. As is true of most native azaleas, it is most spectacular when planted in large groupings in front of an evergreen backdrop. Ironically, one of the principal threats to the orange azalea is the wanton pursuit by its admirers. Well-meaning individuals often try to transplant the wild plants, usually without success, thus reducing native populations. Since nursery-grown plants are available at many locations in north Florida, there is no reason to dig these plants from the wilderness.

All wild populations of native azaleas are afforded protected status by the Preservation of the Native Flora of Florida Act, administered by the Florida Department of Agriculture and Consumer Services. The orange and Alabama azaleas and the Chapman's rhododendron are listed as endangered species, and the swamp honeysuckle is threatened. All four species are in danger of extinction from the wild. While the piedmont azalea is not considered to be as rare as the other species, it too is threatened by commercial exploitation.

The delicate beauty of our native azaleas is unparalleled in nature. This is one life-form we have the ability to enhance, simply by admiring it in its native terrain and resisting the urge to adopt it.

– Maureen MacLaughlin and Gray Bass

A New ZOO REVIEWED

By Celeste Gutierrez-Sanders
Photographs by Lt. Stan Kirkland

It's 6 o'clock in the morning and time for Lt. Bruce Cockcroft to get his children ready for school. He makes breakfast for his daughter, Briana, and son, James, and at 8 o'clock leaves for work. After returning a few telephone calls and checking on some complaints, it's time to start making the rounds at the various pet shops, animal exhibits, wildlife retailers and wholesale houses.

Cockcroft is one of nine Florida Game and Fresh Water Fish Commission wildlife inspectors who must check on more than 7,000 people who have permits to possess captive wildlife. He is the sole wildlife inspector stationed at the Commission's Northwest Regional Office in Bay County and is responsible for a 16-county area. Today he won't have to travel too far. His destination is Zoo World in Panama City.

Zoo World, which opened in the summer of 1992, is owned by Dr. Gerrie Barr, a Panama City veterinarian, and H.P. Byrd, a Montgomery, Ala. business man. It's located at the site of the former Snake-a-torium, a reptile farm that had less than a sterling reputation.

"Snake-a-torium was literally a snake pit. We'd cited them for numerous and repeated violations regarding unsanitary conditions," Cockcroft said.

A monkey island habitat at Zoo World.

Lt. Bruce Cockcroft inspects a bird habitat at Zoo World.

"My practice was located across the street from Snake-a-torium, and I watched the place deteriorate for 10 years," Barr said. "Four years ago, because of the nice location, I tried to find some investors to help me build a zoo – a zoological and botanical type of park."

Today, that former facility is an attractive and beautifully landscaped nine-acre operation. Six acres are devoted to animal exhibits and three acres to its supply shop, quarantine room and holding area. Zoo World is a successful example of what an exhibitor with a small collection of animals can do. The exhibits have been well thought out. Enclosures are serviceable and clean, and larger than the dimensions specified by law.

Two years of planning went into building this zoo. Although the Commission requires exhibitors to submit only proposed cage dimensions for review, Zoo World's owners submitted their design plans for suggestions.

"I'd been involved with and knew several wildlife officers and the former zoo owner," Barr said. "I didn't want to incur any problems; I wanted to take care of them early in the planning stage. So, I asked the Commission for help."

Barr said that if it weren't for the Commission, he would have run into an immediate problem with the zoo's "exhibit islands."

"There was a change in the regulations on how to use water barriers in the zoological island exhibits. The Commission advised us on how to construct the islands with the proper type of sloped-wall barriers, and we have not had any problems so far."

As Cockcroft and Zoo World demonstrate, the relationship between inspectors and exhibitors need not be adversarial. It even can be advantageous. An inspector's work brings him or her in contact with all types of facilities, and he or she can pass along valuable information about ideas that have been tried elsewhere.

Cockcroft is glad to offer suggestions involving safety or design. For example, he recommended that Zoo World mark venomous-reptile cages with orange or red tape to alert employees at a glance to approach the animals with caution.

The regulations regarding captive wildlife, regardless of whether they will be put on display, are specified in Florida Statutes 372.921 - .922 and in Title 39-6 of the Florida Administrative Code. These sections classify animals into three categories, depending on how much of a threat they are to human safety. Class I wildlife includes animals such as gorillas, lions and elephants. Class II wildlife includes howler monkeys, cougars, wolves and badgers. Forty-two species are listed as Class I or II wildlife. Other wildlife species are categorized as Class III animals.

At least one year of experience or a biological degree is needed to obtain a permit to possess Class I and Class II specimens. Certain Class III animals do not require a permit. The Commission, which enforces the state's fish and wildlife laws, is concerned about the health and welfare of captive animals. It grants ▷

permits only to persons qualified under law to possess and care for wildlife properly.

"We require experience with the various species so that the animals receive proper care, they're maintained under humane and sanitary conditions, the public is protected from the animal, and the animal is protected from the public," said Capt. Jerry Thompson, inspections coordinator.

Stacy Johnson, Zoo World's curator, agrees.

"We don't hire just anyone off the street. An inexperienced keeper is a liability because of the dangers of handling some animals. We try to hire employees with degrees or experience in biology and zoology," Johnson said.

The Commission is authorized to conduct unannounced inspections. It also has the power to confiscate or release any animal that is mistreated or neglected.

"When inspectors note violations, the exhibitor is notified of the deficiency and is given 30 days to improve conditions," Thompson said. "Under emergency conditions (unsafe or filthy conditions), inspectors can take immediate action to resolve the problem. If a follow-up inspection reveals that substantial improvements have not been made, we can petition for removal of the animal."

Inspectors go through a check list as they survey each wildlife facility. Do the animals appear healthy? Are wastes properly disposed? Are the animals provided sufficient protection from extreme temperatures and weather? Are records kept up to date as required by law?

Conducting an inspection is not as easy as it may seem; it requires special training.

"There are certain things you can't get from a book and other things you learn by seeing them all the time. You have to know about animal compatibility, diet and special needs," Cockcroft said.

"For example, lions aren't really fence climbers, which means that sometimes you can put them in cages without a top. However, you can't keep tigers in the same open-top cage because tigers can jump and climb better than lions. They need a cage top or overhang."

"Putting perching birds with ground birds would work out fine, but if you had two different types of perching birds together, they would compete for the perches. Snakes are competitive, too. Some snakes will eat other snakes."

An October inspection of Zoo World by Cockcroft revealed a few deficiencies. The spectacled bear cage had not been cleaned that morning. The tiger cage needed secondary security because the fencing wires weren't all the same strength. He recommended that the zoo install an alarm system in case of emergency. But, all things considered, Zoo World scored an "A" rating.

Celeste Gutierrez-Sanders is a public information specialist in the Commission's Tallahassee office.

(top) Lt. Bruce Cockcroft, Zoo World co-owner Dr. Gerrie Barr (center) and curator Stacy Johnson have a cooperative relationship that works to the attraction's advantage.

(below) Zoo World's aviary houses 15 species of birds.

(left) A Sumatran tiger.

Lightning Protection On Your Boat

By William J. Becker

Florida has more thunderstorms, and therefore more lightning strikes, than any other state. Sadly, Florida also leads the nation with its average of more than 10 deaths and 30 injuries from lightning per year. Nearly half of the victims are involved in recreational activities, and nearly 40 percent of those are water-related: boating, swimming, surfing and others.

Understanding thunderstorms, lightning and the precautions to take in order to avoid tragedy can keep your water activities pleasurable.

Lightning Phenomena

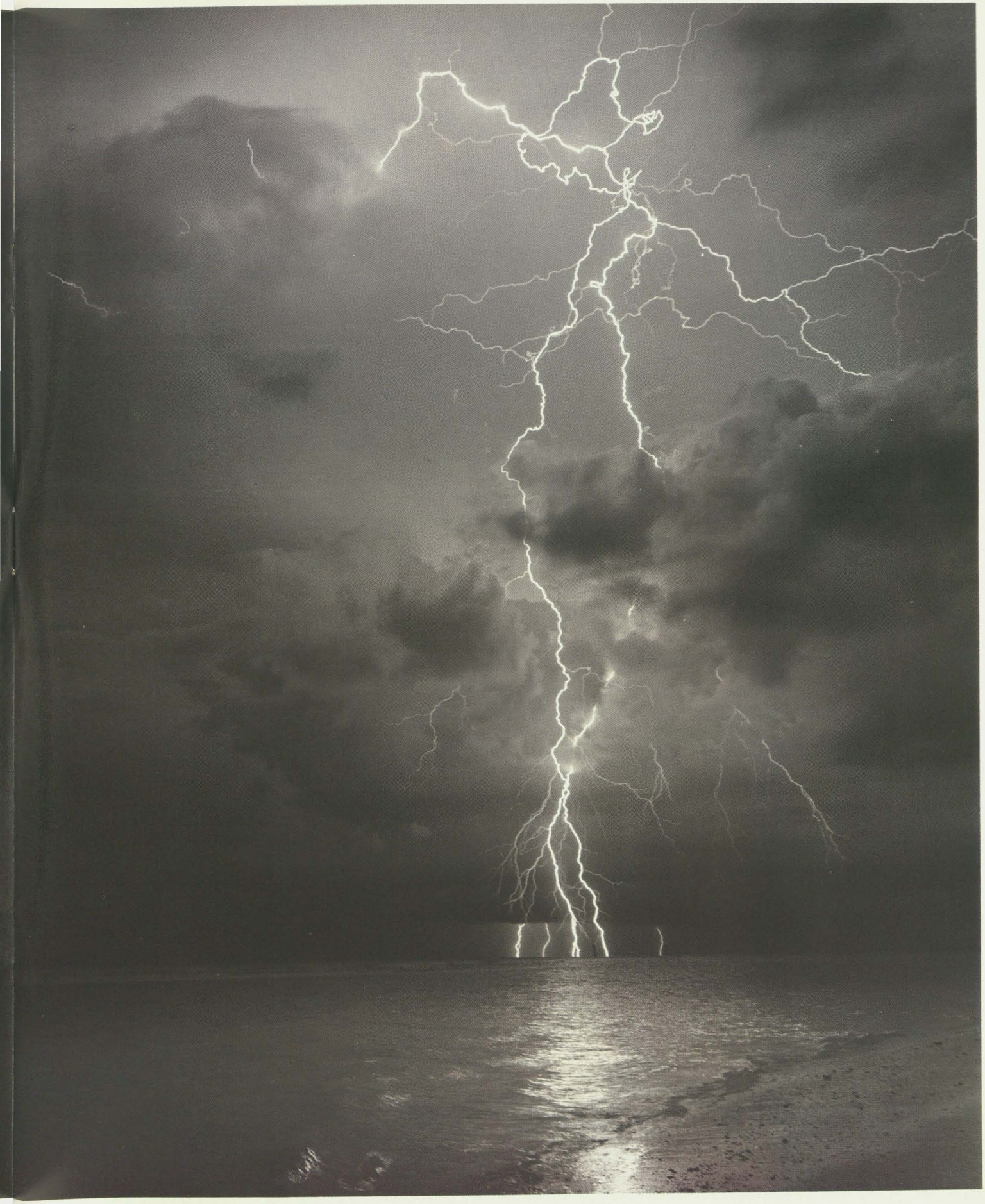
Most lightning strikes occur in the afternoon – 70 percent between noon and 6 p.m. As the air temperature warms, evaporation increases. This warm, moisture-laden air rises and evaporates, forming fluffy cumulus clouds. As more moisture accumulates, the clouds darken and change into cumulonimbus clouds – thunderstorm clouds – frequently, with a flattened top or anvil shape reaching to 40,000 feet or more.

The upper portion of the cloud develops a positive electrical charge, while the lower level develops a negative charge. Because air is a poor conductor of electricity, it restricts the flow between these attracting electrical charges.

While this phenomenon is occurring in the clouds, a similar phenomenon is occurring on the ground. As a thundercloud passes overhead, a concentration of positive charges accumulates in and on all objects below it. Since these positive charges are attempting to reach the negative charge of the cloud, they tend to accumulate at the top of the highest object around. On a boat, that may be the radio antenna, the mast, a fishing rod or even you! The better the contact with the water, the more easily these positive charges can enter the object and race upward toward the negative charge in the bottom of the cloud.

Lightning occurs when the difference between the positive and negative charges (electrical potential) becomes great enough to overcome the resistance of the insulating air and force a conductive path between the positive and negative charges. This potential may be as much as 100 million volts. Compare this to an automobile spark plug, which needs only 15,000-20,000 volts to fire.

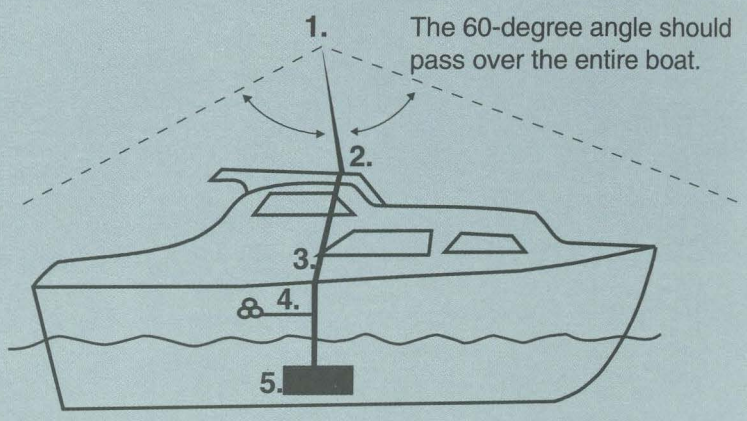
Lightning strikes may move from the bottom to the top of a cloud, from cloud to cloud, or most-feared, from cloud to ground. And when lightning does strike, it most often will strike the highest object in the immediate area. On a body of water, that object is a boat. Once it strikes the boat, the electrical charge takes the ▷



WOODY WALTERS

Components of a Lightning-protection System

1. lightning-protection mast
2. bimetal connectors
3. conductor – No. 8 AWG copper minimum (conductor shoud be as straight as possible from mast to ground plate)
4. interconnectors –from metal components
5. ground plate



most direct route to the water, where it will dissipate in all directions. You could be a part of that route.

Lightning Conductors

There are a number of scenarios in which you could be a conductor for lightning. Most involve lightning striking a protruding, ungrounded object on your boat – like an antenna or sailboat mast. Your graphite fishing rod is an excellent conductor of electricity. Even if you are just standing or sitting in your boat, you are an excellent target. In any event, the result could be serious injury or death.

You don't even have to be in contact with a conductive part of the boat to feel the jolt. Unless the boat components that could conduct electricity are bonded together and are adequately grounded, side flashes could occur. A side flash is the result of the electrical charge jumping from one component to another in search of a better path to ground. You just might be that "better path."

Minimize Lightning-Strike Damage

Don't become a lightning target. Avoid or leave the water whenever weather conditions are threatening. The National Weather Service continuously broadcasts updated weather forecasts via VHF/FM radio. Never go boating without listening to this service. Their short-term forecasts are quite accurate, but small, localized storms might not be reported. Therefore, it is important that boaters learn to read the weather.

Watch for the development of large, well-defined, rising cumulus clouds. That's the time to head for shore. As the clouds become darker and more anvil-shaped, the thunderstorm is already in progress.

Watch for distant lightning. Listen for distant thunder. On a bright day you may hear the thunder before you can see the lightning. Seldom will you hear thunder more than five miles from its source. That clap of thunder was caused by lightning 25 seconds earlier. The sound of thunder travels at one mile per five seconds. Traveling at 20 mph, a storm that's five miles away can be on top of you in 15 minutes.

Lightning-Protected Boats

There is no such thing as lightning-proof boats, only lightning-*protected* boats. Large, all-metal ships are frequently struck but rarely damaged, and injuries or deaths are uncommon. The high conductivity of the large quantities of metal, with hundreds of square yards of hull in direct contact with the water, causes rapid dissipation of the electrical charge.

But small pleasure boats are seldom made of metal. Their wood-and-fiberglass construction does not provide the automatic grounding protection offered by metal-hulled craft. Therefore, when lightning strikes a small boat, the electrical current is searching any route to ground, and the human body is an excellent conductor of electricity!

Today's fiberglass-constructed small boats, especially sailboats, are particularly vulnerable to lightning strikes, since any projection above the water's flat surface acts as a potential lightning rod. In many cases, the small-boat operator or casual weekend sailor is not aware of this vulnerability to lightning hazards. These boats can be protected somewhat by properly designed and connected systems of lightning protection. However, most boats are not so equipped.

Lightning-protection systems do not prevent lightning strikes. They may, in fact, increase the likelihood of the boat being struck. Their purpose is to reduce damage to the boat and the possibility of injuries or death to the passengers.

If you are considering purchasing a boat, determine whether it is equipped with a properly designed and installed

lightning protection system. Such a system is generally more effective and less costly than one installed on a boat after it has been constructed. For detailed information on the major components of a lightning-protection system, ask your boat dealer, or contact the National Fire Protection Association, One Batterymarch Park, Quincy, MA 02269-9101, 1-800-344-3555.

Ways To Protect Your Boat

The National Fire Protection Association, Lightning Protection Code, suggests a number of ways in which the boater can protect his boat and minimize lightning damage.

1. A lightning-protective mast generally will divert a direct lightning strike within a cone-shaped radius twice the height of the mast. Therefore, the mast must be tall enough to place all parts of the boat within this cone-shaped zone of protection (see diagram page 16).

2. The path from the top of the mast to the grounding point should be essentially straight. Any bends in the conductor should have a minimum radius of 8 inches.

3. The entire circuit should have a minimum conductivity equivalent to a No. 8 AWG copper conductor. If a copper cable is used, the individual strands should be at least No. 17 AWG. Copper metal or strips should be at least No. 20 AWG.

4. Major metal components aboard the boat, within six feet of the lightning conductor should be interconnected with the lightning-protection system with a conductor at least equal to No. 8 AWG copper. It is preferable to ground the engine directly to the ground plate rather than to an intermediate point.

5. If the boat's mast is not of a lightning-protective design, the associated lightning or grounding connector should be essentially straight, securely fastened to the mast, extended at least six inches above the mast, and should terminate in a sharp receiving point.

6. The radio antenna may serve as a lightning-protective mast, but it and all the grounding conductors must have a conductivity equivalent to No. 8 AWG copper and be equipped with lightning arresters, lightning-protective gaps or means for grounding during electrical storms. Most antennas do not meet these requirements. The height of the antenna must be sufficient to provide the cone-shaped zone of protection.

7. Antennas with loading coils are considered to end immediately below the loading coil unless this coil is provided with a protective device for bypassing the lightning current. Nonconducting antenna masts with spirally wrapped conductors are not suitable for lightning-protection purposes. Never tie down a whip-type antenna during a storm if it is a part of the lightning-protection system. But antennas and other protruding devices not part of the system should be tied down or removed during a storm.

8. All materials used in a lightning-protection system should be corrosion-resistant. Copper, either compact-stranded, concentric lay-stranded or ribbon, is resistant to corrosion. ▷

PHIL MASZAK, MERCURY MARINE

9. The ground connection may be any submerged metal surface with an area of at least one square foot. Metallic propellers, rudders or hull will be adequate.

10. On sailboats, all masts, shrouds, stays, preventors, sail tracks and continuous metallic tracks on the mast or boom should be interconnected (bonded) and grounded.

11. Small boats can be protected with a portable lightning-protection system. This would consist of a mast of sufficient height to provide the cone of protection connected by a flexible copper cable to a submerged ground plate of at least one square foot. If you observe lightning conditions in the distance, mount the mast near the bow and drop the ground plate overboard. The connecting copper cable should be fully extended and as straight as possible. Boaters should stay low in the middle or aft portion of the boat.

William J. Becker is Assistant Professor/Extension Safety Specialist with the Agricultural Engineering Dept., IFAS, University of Florida. This article was excerpted from Sea Grant bulletin SGEB-7: Boating – Lightning Protection.

When Caught in a Storm

Florida thunderstorms are frequently unpredictable. Even with the best forecasts and observation of weather conditions, boaters can find themselves caught in a fast-developing storm. Then, even with a lightning-protection system, it is critical to take additional safety precautions to protect yourself and your passengers.

1. Stay in the center of the cabin if the boat has one. If no cabin is available, stay low in the boat. Don't be a human lightning rod!

2. Keep arms and legs inside the boat. Do not dangle them in the water.

3. Discontinue fishing, water skiing, scuba diving, swimming or other water activities when there is lightning or even when conditions look threatening. Lightning can strike a mile or more in front of an approaching storm cloud.

4. Disconnect and do not touch your boat's major electronic equipment, including the radio, for the duration of the storm.

5. Lower, remove or tie down the radio antenna and other protruding devices if they are not part of the lightning-protection system.

6. Avoid as much contact as possible with any portion of the boat connected to the lightning-protection system. Never simultaneously touch two components connected to the system (i.e. gear lever and spotlight handle).

7. Learn cardiopulmonary resuscitation (CPR) and first aid. Many individuals struck by lightning or exposed to excessive electrical current can be saved with prompt and proper CPR. There is no danger in touching persons after they have been struck by lightning.

8. If you know or suspect that a boat has been struck by lightning, check out the electrical system and the compasses to ensure that no damage has occurred.

GEORGE WHITE

When a storm approaches, head for shore.

JAMES VALENTINE

Florida's High-Pine *Sandhill* Communities

By Dr. Henry R. Mushinsky
Introduction by Hugh Boyter

The Decline of Sandhill Communities

Anyone who has been in Florida for even a short time knows that human inhabitants have drastically altered the state's natural habitats. But most people do not realize the extent to which Florida's high-pine lands have been destroyed or modified.

The U.S. Forest Service has recorded an 88-percent decline in longleaf pine forests, also called sandhill communities, in just over 50 years. This forest type once occupied over 7.6 million acres of the state – more than one-fifth of its total land and water area. Today these ecologically valuable pine lands extend over less than one million acres.

Such drastic reductions in ecosystems inevitably result in a chain reaction of negative consequences. A number of wildlife species associated with sandhill systems have been relegated to endangered, threatened or species of special concern status. The red-cockaded woodpecker, Florida pine snake, gopher tortoise, indigo snake and Sherman's fox squirrel are just a few of these. The decline of the gopher tortoise, however, sets off its own chain reaction. The deep, sandy burrows of this species are known to be useful to at least 30 other wildlife species.

Fortunately, the decline of longleaf pine communities has not gone unnoticed by the conservation community. The state's natural resource agencies and conservation organizations have recognized the problem and have used the purchasing power of land-buying programs to salvage some of the remaining sandhill habitats. Approximately 130,000 acres of sandhills have been purchased through land-acquisition programs such as Preservation 2000, Environmentally Endangered Lands (EEL) and Conservation and Recreational Lands (CARL). Further, the "Longleaf Pine Ecosystems" project, currently ranked seventh on the CARL priority list, would add another 18,000 acres of valuable high-pine habitat to that already in public ownership.

Much of the pineland already bought, or on the purchase list at this time, is sandhill community that was converted to another forest type. Now, managing agencies will be challenged to find correct and innovative ways to restore these altered habitats to the "original domain" that existed prior to the arrival of Europeans. The Florida Division of Forestry is attempting just such a restoration project at Arbuckle State Forest in south Florida. Arbuckle once contained a sandhill community that was converted to north Florida slash pine for commercial forestry purposes. The Division of Forestry is now undertaking a project to restore the land to a sandhill community.

The Game and Fresh Water Fish Commission faces a similar challenge on the Big Bend Wildlife Management Area, where prior to state ownership, approximately 2,500 acres of sandhill community were cleared of longleaf pines and planted to sand pine by commercial forestry interests. In some of those stands, the reproductive parts of understory species (the low-growing components) may no longer exist. Regenerating these stands, with the understory, will be challenging but necessary, since some plant species in these communities are dependent on others, just as the gopher tortoise and its commensal animal species are entwined. Longleaf pines are particularly dependent on wiregrass to carry fire throughout the community. The pines and other sandhill plants are dependent on and adapted to this natural cycle. Therefore, if wiregrass is missing because of destruction by forestry machinery, or because of shading from sand pines, "seedlings" of wiregrass must be planted to assist in the restoration process. Perhaps other community components will need to be artificially regenerated as well.

The relatively recent interest in acquiring and/or restoring tracts of sandhill community is both exciting and encouraging. Perhaps this conservation commitment will translate into action that will assure quality habitat for a number of rare species. If we are fortunate, that proactive interest will keep us from adding sandhill inhabitants to the list of critically rare species like the Florida panther. Only now are we learning that it is very difficult and expensive to recover such species when they have reached a high state of endangerment.

Certainly, of all habitats found in Florida, the sandhill community ranks among the most threatened. If we can protect a viable component now, we will have made great strides toward averting a conservation crisis later.

Hugh Boyter is a biological scientist with the Commission's Bureau of Wildlife Management and formerly served with the Florida Division of Forestry.

HENRY R. MUSHINKSY

Without periodic fires, a dense understory will develop, making sandhills unsuitable for many resident species.

Once a predominant habitat in Florida, high, dry pine sandhills are becoming rare, as are the species that reside within. Sandhill habitat, also called high-pine, is an upland community type that occurs on well-drained, yellow sands, indicative of Florida's geological history. The soils that support these sandhill communities are derived from ancient marine deposits of thick beds of sand with a grayish-brown to dark gray surface overlying yellow sands.

These habitats provide vital recharge areas, where rainfall quickly finds its way through a porous, sandy substrate to replenish underlying aquifers. A longleaf pine/turkey oak overstory covers these nutrient-poor soils to form a widespread community throughout peninsular Florida and the xeric coastal plain regions from southern North Carolina to the "Florida Parishes" of eastern Louisiana.

All sandhills have an open oak/pine canopy, a sparse shrub layer and a well-developed understory dominated by wiregrass and herbaceous plants. The deciduous nature of the oaks and the varying flowering patterns of understory herbs produce pronounced seasonal changes in sandhill appearance and coloration.

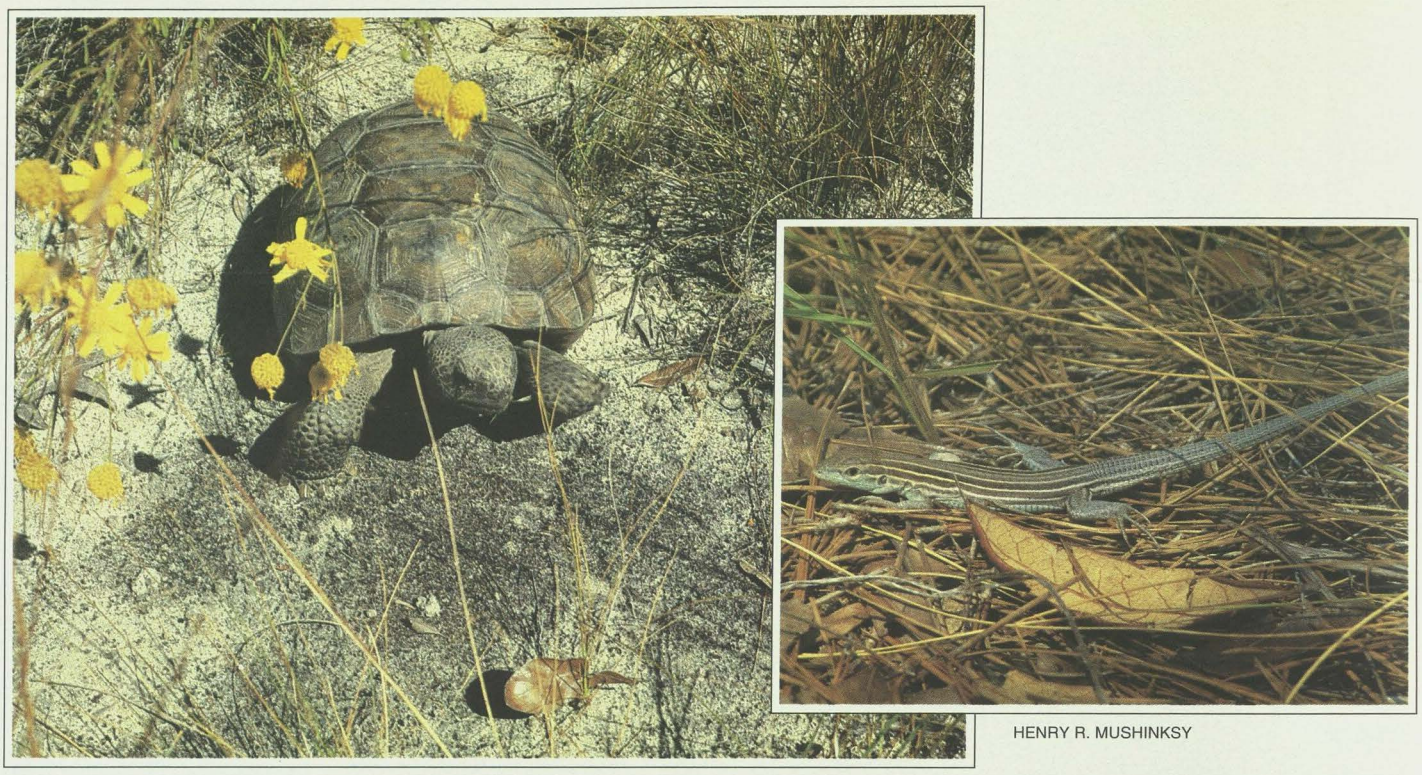
Several different types of sandhill communities are distinguished by their dominant tree species, primarily turkey oak, bluejack oak, live oak, longleaf pine and slash pine. In central and northern Florida, longleaf pine is most common, but in south Florida, slash pine is more evident.

The Importance of Fire

A turkey oak/longleaf pine community that has not experienced a fire in over 25 years will have a relatively thick tree canopy covering 60-70 percent of the habitat. Many of the grasses and herbaceous plants typically found in this community do not grow well in shaded conditions, and surface soils will become covered with a thick layer of dead vegetation and leaf litter as it accumulates over the years in the absence of fire. Closure of the tree canopy is retarded by the frequent, naturally occurring fires so common during the summer months on the peninsula. When a sandhill burns, many of the trees, especially oaks that form the canopy, are killed back to their roots, so fire functions to re-establish openness of the community.

The direct influence of fire on sandhill vegetation is evident in the accompanying photograph of land subjected to periodic controlled burning. Periodic burns every two, five or seven years on the Ecological Research Area of Tampa's University of South Florida promote a luxuriant ground layer of grasses and herbs. Controlled burning of this habitat on a five- or seven-year cycle promotes a partial regrowth of the tree canopy between prescribed fires, and encourages the habitat to remain sufficiently open to support the reptiles that constitute a major component of this community. Like many other plant species occurring in high-pine communities, oak trees resprout from their roots, which are not killed by fire.

In central Florida, natural fires occur most frequently during the months of June, July and August, when frequent lightning strikes ignite the vegetation on ▷



HENRY R. MUSHINKSY

Among the species dependent upon sandhills are the slow moving gopher tortoise (above) and the amazingly fast six-lined racerunner (right).

the sandhills. Those habitats burned regularly quickly recover from fire. In fact, four to six weeks after a fire, virtually all plant life shows signs of re-establishment. Sandhill communities that have not burned for a long period of time, say 20-40 years, experience much hotter fires and recover more slowly than those burned more frequently.

In autumn, many herbs and grasses that form the lush ground cover will flower following a fire, producing aesthetically pleasing fields of purple and gold. Scientists believe this periodic burning is essential to maintaining the openness that characterizes and promotes species diversity of sandhill or high-pine communities. Fire, or lack of it, can indirectly affect animals living there as well.

One would think that fire would reduce stability of a habitat. But just the opposite is true for sandhill communities. Periodic burning seems essential to maintaining Florida's upland communities. Surely, any alteration of the natural burning cycles that have shaped these complex and interdependent relationships for tens of thousands of years will quickly upset sandhill habitat.

Sandhill Inhabitants

Sandhills are home to numerous secretive, colorful and unusual species of reptiles. We often associate this community with a large, conspicuous, docile reptile. The once-ubiquitous gopher tortoise is a burrowing reptile that plays a pivotal role in the life histories of many other animals living on sandhills. Its burrows provide shelter for numerous species of vertebrates and invertebrates alike. The herbivorous gopher tortoise constructs its burrows in the relatively open and sandy patches of habitat that often support a great variety of grasses and herbs.

Without burning every seven to 10 years or so, canopy closure reduces the habitat quality for gopher tortoises, causing them to abandon the shady areas and relocate to a more open area. The gopher tortoise is a keystone species in sandhills. If the habitat becomes unsuitable for them and they leave the area, numerous other species will decrease and may eventually disappear from the area.

Historically, when sandhill communities covered greater expanses of Florida, uninterrupted by highways and cities, gophers were able to move from patch to patch within a great mosaic of habitats created by natural fires. Now, however, human development has curtailed such free movement for wildlife.

Small, isolated fragments of upland habitat often are set aside as nature preserves, designed to accommodate gopher tortoises relocated from surrounding lands because of human development. These areas will support gophers, and the species that depend upon their burrows, for long periods of time only if a land-management program is in effect. Periodic controlled burning to keep the habitat open is essential. Most people were taught that fire is a destructive force that kills plants and animals. This is not the case on Florida sandhills, however, which assume a totally different appearance in the prolonged absence of fire.

Two small, secretive reptiles that inhabit sandhill communities are rarely seen by Floridians. The Florida crowned snake occurs throughout the peninsular portion of the state, where they spend their days burrowed under the sand and their nights in pursuit of beetle larvae and

other prey. The colorful short-tailed snake, a pencil-thick snake that reaches a total length of about 20 inches, is restricted to the central portion of the peninsula and is most frequently found in longleaf pine/turkey oak sandhills. The short-tailed snake's primary food source is the Florida crowned snake. In many food chains adult snakes are top predators, so finding a snake that specializes on another snake is unusual. This relationship may reflect a long-term, stable situation that allowed a sandhill predator species to become so highly specialized that it eats one (or a very few) species of prey.

Among the numerous other reptiles found in sandhills are some brilliantly colored snakes and lizards. The Florida scarlet snake, which inhabits gopher tortoise burrows, often is mistaken for the poisonous coral snake. The scarlet snake is similar in coloration to the coral snake, which has wide bands of red and black, separated by narrow, yellow rings that completely encircle the body. The scarlet snake's red, black and yellow banding patterns are broken by a cream-colored underbelly. Its red nose further distinguishes it from the coral snake, which has a solid black snout.

The six-lined racerunner is an especially common lizard in very open sandhills, where it can be observed darting from shrub to shrub in search of grasshoppers, spiders or other prey. Males of the species are distinguished from females by their bright blue undersides. Young racerunners of both sexes have light blue tails which often are broken off during predator attacks. Racerunners are named for their amazingly rapid running speeds. Their hind legs are considerably larger than the front legs, and their long tails act to counter-balance the lizard's front legs as it lifts off the ground when sprinting at full speed. The hind legs and long tail are adaptations which facilitate their rapid mode of locomotion.

The Eastern indigo snake is one of the most impressive snakes in North America. Its gentle disposition makes it a favorite among reptile collectors, necessitating legal protection throughout their geographic range. Indigo snakes spend the cool months of the year in dry, upland habitats, sometimes overwintering in gopher tortoise burrows. In spring and summer months they often are observed in wetter habitats surrounding sandhills.

Sandhill habitat also is home to the southeastern pocket gopher – a medium-sized, subterranean mammal. They are rodent-like in appearance, but closer examination reveals massive shoulders and arms as well as heavily clawed front feet. Pocket gophers have tiny, bead-like eyes, and their huge front teeth project well out of the mouth. Underground tunnels built by pocket gophers are about six inches below the surface and can spread out over hundreds of feet. Pocket gophers push or kick the excavated sand out of their tunnels as they dig, producing conspicuous mounds of sand which identify the tunnel pathway. Pocket gophers are herbivores and frequently feed just below ground surface on young, tender roots and tubers. Their tunnels are used by Florida pine snakes, who, like pocket gophers, spend very little time above ground. Carnivorous pine snakes eat a wide variety of small animals, including pocket gophers.

Like most types of upland communities in Florida, sandhill or high-pine habitats are vanishing and being fragmented by human development. Without stringent land-management practices, many species of animals living in fragmented patches of sandhill, often surrounded by developed land, are doomed to local extinction. Without fire, the tree canopy will close up in a few decades, altering the understory that makes the habitat unsuitable for several resident species. As gopher tortoises decline in abundance and leave a particular site in search of better quality habitat, numerous other species will decline as well. Periodic controlled burning is necessary for proper maintenance of this habitat.

It's up to us to make provisions for the long-range preservation of the species that characterize this precarious habitat.

Dr. Henry R. Mushinsky is an associate professor of biology at the University of South Florida. He has published numerous scientific papers and has written chapters in books on biology and ecology.

HENRY R. MUSHINKSY

A short-tailed snake prepares to attack its primary food source – a Florida crowned snake.

By Susan Cerulean and Ann Morrow

Florida's Western Edge

Like many Floridians, we usually confine our weekend field trips to much-beloved birding spots and favorite canoe runs within 50 miles of home. We have taken occasional excursions to the Everglades and other points south of Tallahassee but generally left the western panhandle to Alabama and Georgia tourists and the locals. But now that we've visited Gulf Islands National Seashore and its environs, we're sure to include it as a regular travel destination.

If you haven't "gone west" either, try these two excellent wildlife viewing sites just south of Pensacola sometime soon!

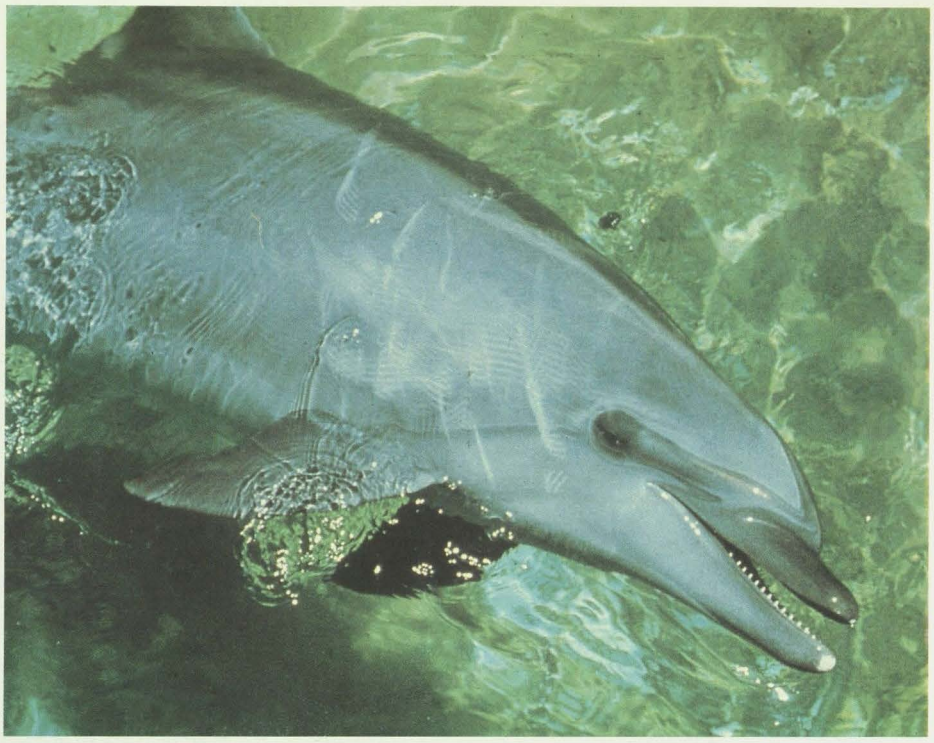
GULF ISLANDS NATIONAL SEASHORE

Site Description: Gulf Islands National Seashore stretches 150 miles from West Ship Island in Mississippi to the end of Santa Rosa Island in Florida. We report here on the Fort Pickens and

Naval Live Oaks sections of the national seashore in Florida. White quartz beaches and the historical ruins of Fort Pickens draw millions of visitors each year. But local birders and wildlife enthusiasts also love these barrier islands, and with good reason. Several diverse ecological communities host a wide variety of animal life. Wildlife habitat is provided by open beaches and dunes, freshwater marshes and wooded areas around Fort Pickens.

Salt and freshwater marshes and oak hammocks dominate the Naval Live Oaks area of the park. Both are worth a visit.

Wildlife Viewing (Fort Pickens): From the beach, visitors regularly spot dolphins and pelicans, as well as gulls, terns and other shorebirds. In the winter, a spotting scope will assist in locating gannets, loons, scoters and ducks using the near-shore waters. Although once a common sight, least terns and black skimmers no longer attempt beach- ▷



NATIONAL PARK SERVICE

Santa Rosa Island

NATIONAL PARK SERVICE

nesting due to heavy human use in the summer months. You may spot these birds from May through July on rooftops of Pensacola Beach businesses, trying to raise their young out of reach of humans and their dogs.

The Dune Nature Trail, across from Campground Loop A, is a good spot to test your track-reading skills. Beach mice, raccoons, rabbits and snakes frequent the sandy dunes, and their tracks are just as fun to decipher here as in the snow. A population of Santa Rosa Beach mice is fairly stable on this barrier island, and at night you may see one skitter across the road in your headlight shine.

The trail of the old railroad bed from the campground to Fort Pickens passes through brackish marshes frequented by herons, egrets, marsh wrens, rails and even least bitterns. On foot or bicycle, it's a great way to see the island's interior residents. Migrant warblers, vireos and thrushes may be abundant in the spring. During winter months, this is a good spot to locate a groove-billed ani. Watch for beaver sign – dams or chewed branches are common, although the animals are seen infrequently. Tall pines near the visitor center are a good place to observe a small rookery of great blue herons from January through June. Watch your step – rattlesnakes are common all over the island.

If mid-size mammals are what you'd like to see, search the campgrounds, especially at dawn and dusk. Possums, raccoons, hispid cotton rats and an interesting race of striped skunks (some completely black, some black with white ears, others with unusual "topknots") panhandle nightly. Coyotes have reached this part of the state, but it's unlikely you'll see one.

Wildlife Viewing (Naval Live Oaks): A trail from the visitor center passes through a live oak hammock dominated by large magnolias, hickories and red cedars. Walk along the shore of Santa Rosa Sound to view plovers, willets, great blue herons and other waders and shorebirds. In winter, the bay is a popular

NATIONAL PARK SERVICE

Fort Pickens, Gulf Island National Seashore

STEVEN FRAME

spot for observing ducks. The woods can be excellent for spring and fall birding. Look for tracks of raccoons, foxes and other mammals along the narrow beach. There is a good view of Santa Rosa Sound from an observation platform at the west end of the trail.

Other Recreational Opportunities: Information is available at both visitor centers, with exhibits, aquariums and information desks located at Naval Live Oaks Area and Fort Pickens. A campground with 200 sites is located near Fort Pickens and open daily. Some have electricity; no reservations accepted. Each developed section of the seashore in Florida has picnic areas. Swimming areas are located at Fort Pickens; outdoor showers are available. Fishing and boating opportunities abound.

Hours of Operation: The Fort Pickens visitor facilities are open 9 a.m.-4 p.m. year round; Naval Live Oaks visitor center is open 8:30 a.m.-4:30 p.m.

How To Get There: Take U.S. 98 East from Pensacola across Pensacola Bay to Gulf Breeze. The Naval Live Oaks Area is just east of Gulf Breeze on U.S. 98. To reach Fort Pickens, travel on S.R. 399 from Gulf Breeze to Pensacola Beach. From there, Fort Pickens is nine miles west.

For More Information: 1801 Gulf Breeze Parkway, Gulf Breeze, FL 32561; (904) 934-2600.

BIG LAGOON STATE RECREATON AREA

Site Description: This state park takes its name from Big Lagoon, a bordering body of water that hosts a portion of the Intracoastal Waterway. Nearly 700 upland acres offer not only wildlife viewing and nature study, but facilities for picnicking, camping, fishing, swimming and boating. For wildlife enthusiasts, cool fall, winter and spring months offer especially good viewing opportunities.

Big Lagoon harbors several increasingly rare plant communities native to ▷

(above, below) Big Lagoon State Recreation Area

PAGE 27 PHOTOS BY MILO STEWART III, FL DIVISION OF TOURISM

Florida's rapidly urbanizing coasts. Sand pine scrub clings to sandy relic dunes along the Sand Pine Trail. Its dwarf, twisted vegetation, including Florida rosemary, saw palmetto and sand pines, speaks to the harshness of life at the saltwater edge of land. Fingers of a beautiful little salt creek insinuate themselves into the sand pine forest, offering surprising visual contrast. Slash pines grow in water-logged troughs called "swales" just beyond the old dune ridges. Visitors can take a 45-minute walk through this community on the Long Pine Trail.

In all, four nature trails interpret vegetative and geological features of this diverse site. An observation tower at East Beach provides a panoramic view of Big Lagoon, the recreation area and Gulf Islands National Seashore across the Intracoastal. From the tower, you'll notice condos dotting the horizon from Perdido Key, or perhaps a big barge passing close by.

Wildlife Viewing: Visitors have observed 180 bird species, including mergansers, grebes, common loons, buffleheads and scaups, which are common on the park's open waters in winter. Many wading birds forage along the marshy edges of the lagoon year round. Gulls, terns and shorebirds are viewed easily from the bridge and boardwalk at East Beach. Big Lagoon is a great place to find warblers and thrushes after a spring storm, and during the fall, these songbirds abound as they begin long, migratory flights across the Gulf of Mexico. Berry-filled droppings attest to heavy raccoon use of the boardwalks when there are few human visitors.

Possums, foxes and striped skunks also live at Big Lagoon, and are most likely to be seen early in the morning or around dusk.

Other Recreational Opportunities: Five picnic areas with shelters are available along the shores of Big Lagoon. A boat ramp with dock provides easy access to the Intracoastal Waterway. Seventy-five campsites are located in the center of the park amid tall pines. East and West beaches are open to swimming (without lifeguard service).

Hours of Operation: The park opens at 8 a.m. and closes at sunset year round.

How To Get There: Big Lagoon State Recreation Area is located on C.R. 292A, approximately 10 miles southwest of Pensacola.

For More Information: Contact Big Lagoon State Recreation Area, 12301 Gulf Beach Highway, Pensacola, FL 32507; (904) 492-1595.

Susan Cerulean and Ann Morrow are wildlife biologists and free-lance writers whose articles frequently appear in FLORIDA WILDLIFE.

E. HALLRECHT, NATIONAL PARK SERVICE

Distinguishing

Brazilian Pepper From Dahoon Holly

Text and Photographs by Chuck McCartney

Brazilian Pepper – This exotic was introduced to Florida from South America as an ornamental, prized for its beautiful winter displays of clusters of brilliant red fruits. It has become naturalized throughout central and south Florida, and is now one of the state's worst invasive pest plants.

Because its red fruits ripen near Christmas, it erroneously has come to be called "Florida holly," a common name that should be discouraged. This invasive plant is not from Florida, and it's not a true holly. In fact, because this species is in a plant family that includes poison ivy and poison sumac, one naturalist suggested calling it Brazilian poisonwood. Some people do have an allergic reaction to the plant's turpentine-scented sap.

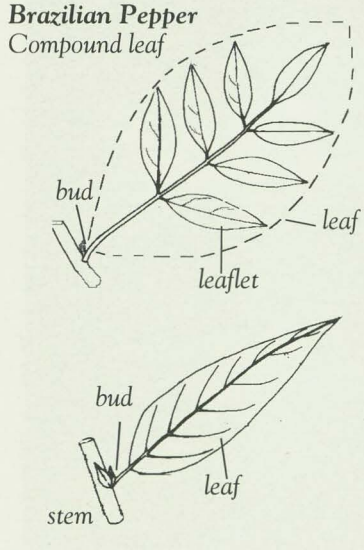
Dahoon Holly – This native holly is found throughout Florida, where it is a classic wetland-indicator species. A true holly, the female plants bear handsome clusters of fleshy, red fruits primarily in the fall and winter in south Florida. Because of its beauty and adaptability to habitats other than its natural wetland haunts, this species is increasingly being used as a landscape plant. Unlike its thorny-leaved cousin, the American holly (*Ilex opaca*), the shiny leaves of the dahoon holly show only vestigial spines – if any at all.

Both plants have alternate, oblong, evergreen leaves. Although the plants are superficially similar, the leaf arrangement differentiates the two. The Brazilian pepper has pinnately compound leaves (with 3-11 leaflets), as opposed to the dahoon holly's simple leaves (see diagram).

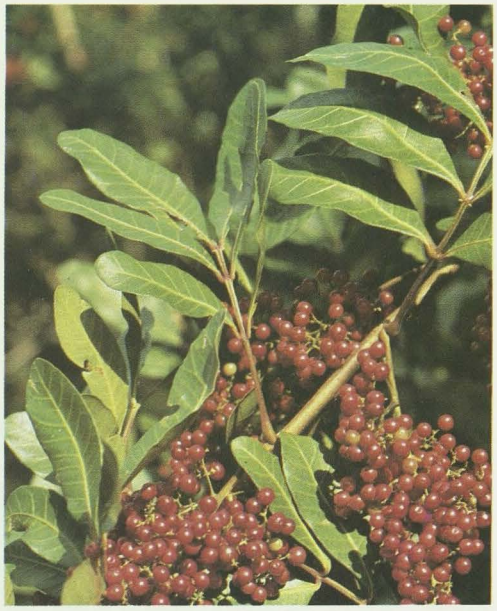
Eradication Options

Exotic plants were introduced into Florida, sometimes with the best of intentions, but spread to the point of displacing native species.

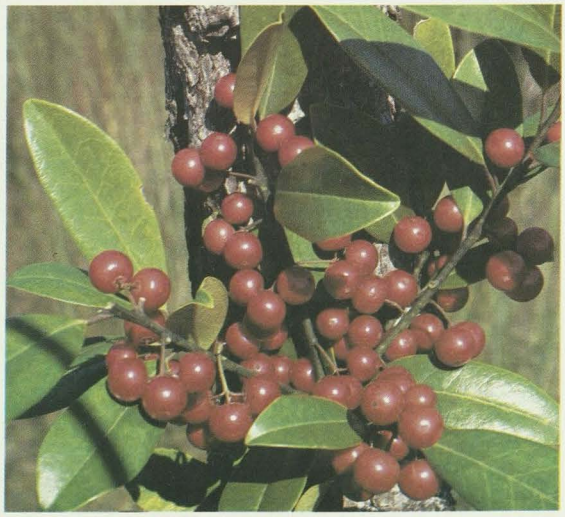
Homeowners can eradicate exotic invaders by digging up or hand-pulling seedlings. Otherwise, plan to kill larger trees either by cutting the tree down and applying the poison directly to the stump or by using the basal bark treatment. For the cut-stump treatment, apply herbicide to the top of the stump as quickly as possible after cutting. Otherwise, the roots will resprout with vengeance. Or, spray a 3- to 4-inch strip of herbicide solution on the bark, completely around the tree about one foot above the ground. Do not apply herbicides to the point of runoff.



[Editor's note: We regret that the January-February issue (page 22) contained a photograph of dahoon holly that was misidentified as the invasive Brazilian pepper.]

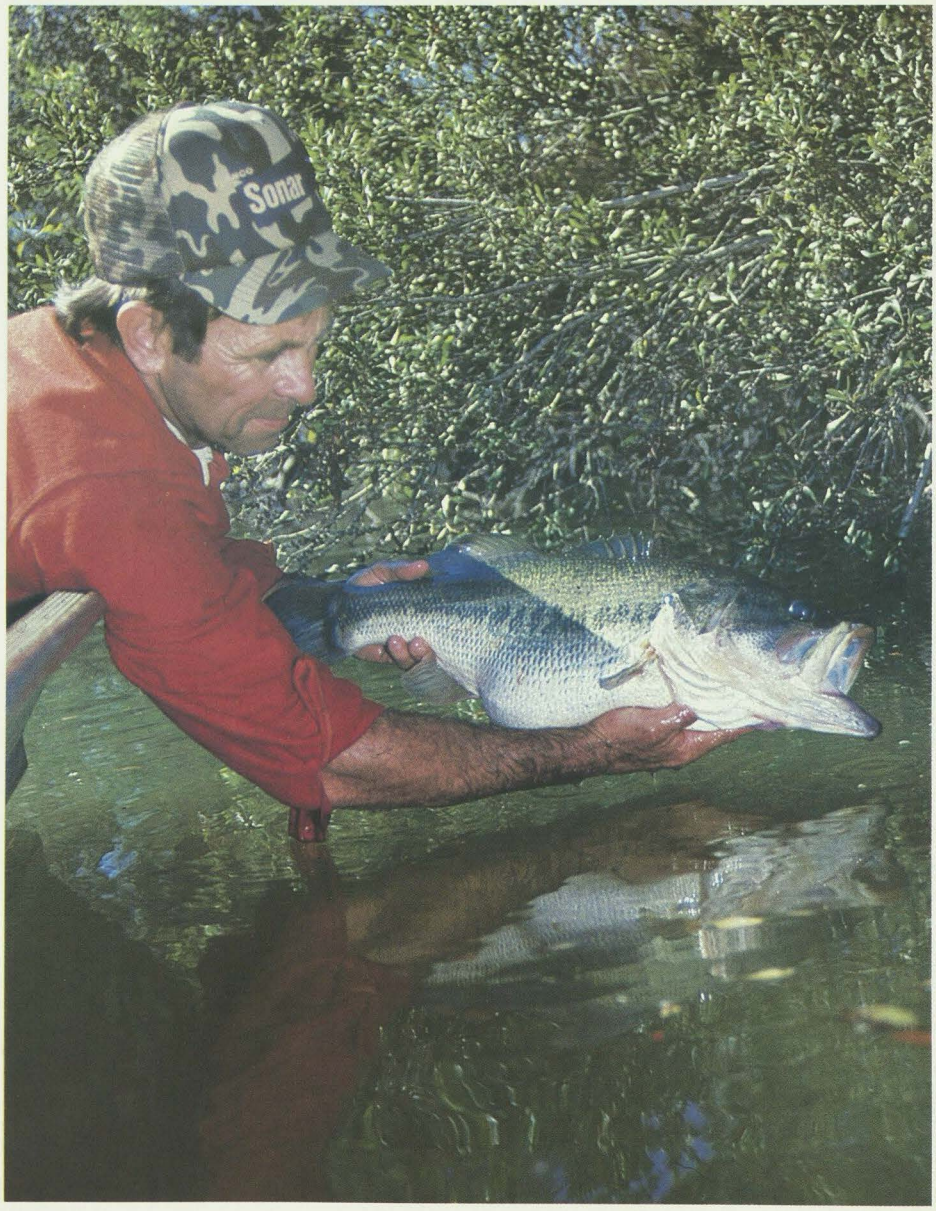


Brazilian Pepper (Schinus terebinthifolius Raddi)



Dahoon Holly (Ilex cassine Linnaeus)

Catch-and-Release Bass Fishing at Tenoroc



Text and Photograph by
Phil Chapman

In case you haven't noticed, Florida has changed. It was inevitable. Lured by an ideal climate and three million acres of fresh water, our population has increased at an alarming rate. Caught in the struggle over more land for development, Florida's aquatic habitat has suffered, placing even greater demands on our fisheries resources.

Florida anglers have high hopes. Not only do they want to catch fish at a good pace, they want larger fish, particularly Florida's premier freshwater game fish, the largemouth bass. An impossible goal in this time of strained resources? Not so. Results from a Game and Fresh Water Fish Commission research project point to a win-win answer to this dilemma: catch-and-release.

In 1984, the statewide bag limit in Florida for largemouth bass was a generous 10 fish per day. Yet at the same time, anglers were concerned over a decline in quality fishing opportunities due to increased demands on the state's limited resources. Commission scientists decided to test a variety of regulations restricting harvest (fish caught and kept) as a means of improving the overall bass-fishing experience. They selected Tenoroc Fish Management Area, near Lakeland, as the site of this study.

The Tenoroc property, donated to the state in 1983, contains a series of reclaimed phosphate pits. Their relatively

small size, coupled with tightly controlled access to the property, made Tenoroc an excellent outdoor laboratory for such an experiment.

First, they studied the existing fish populations in Tenoroc lakes. Then they implemented experimental bass-fishing regulations, such as minimum size limits, maximum size limits, slot size limits, reduced bag limits, catch-and-release limits and gear restrictions. Angler quotas on all lakes added another measure of control over harvest and fishing pressure. In addition, anglers were required to obtain a daily fishing permit and provide an accurate record of all fish caught, including sizes of bass, both kept and released.

The success or failure of this innovative approach would depend on social as well as biological factors. Would anglers accept the inconvenience of permitting, reporting and limited access, when hundreds of other nearby lakes were available? Would they fish lakes where most or all largemouth bass must be released? And could bass be "recycled" – were they hardy enough to tolerate the stress of being caught then released?

After nine years of study, the verdict is in. Lakes with restrictive harvest regulations fared better than control areas with general state regulations, but one approach clearly produced quality bass fishing: catch-and-release.

Consider the results from three lakes with catch-and-release bass regulations. Lakes A, C and 3 ranged in size from 20 to 75 acres and varied widely in water quality, aquatic vegetation, shoreline configuration and bottom structure. When lakes A and C first opened for public fishing, each had fewer than five "adult" (10 inches or longer) largemouth bass per acre. Heavy coverage of water hyacinths had suppressed the bass population. After the hyacinths were eradicated, nutrients in the plants were released. That, coupled with catch-and-release regulations, enabled the bass population to stabilize, then flourish. After five years, adult bass numbered 29 per acre in Lake A and 36 per acre in Lake C (increases of 525 and 650 percent, respectively).

These increasing bass populations did not go unnoticed by anglers. In 1984, annual bass fishing pressure was 29 hours per acre in Lake A and 17 hours per acre in Lake C, typical of Florida public waters. By 1989, angling pressure increased to 117 hours per acre in Lake A and to 131 hours per acre in Lake C. In spite of greatly increased fishing pressure, the success rate did not decline. Catch rates for bass climbed in both lakes from 0.19 bass per hour to about 0.60 bass per hour over the first five years of the study. These catch rates were well above the generally accepted state average of 0.25 bass per hour. No other public lakes in Florida are known to maintain such excellent bass-fishing success under the level of fishing pressure on catch-and-release lakes at Tenoroc.

A follow-up evaluation on Lake 3 substantiated previous findings. Bass-fishing pressure during the final year of study was 104 hours per acre, the third highest observed at Tenoroc (behind lakes A and C). Angler success for bass in Lake 3 remained high at 0.46 fish per hour during the final year of the study. Bass anglers voted with their rods, spending most of their time where fishing was most productive.

In addition to high success rates, the size of bass in these lakes was equally impressive. While the average size of bass in most state waters ranges from 11 to 13 inches, bass in all three catch-and-release lakes averaged 15 inches.

Tenoroc data answered other questions about catch-and-release bass fishing as well. Anglers caught the equivalent of 100 percent of the estimated bass population in lakes A and C within 24 fishing days after opening to the public. Without extreme harvest restrictions, these fisheries would have collapsed and likely never recovered. Also, during the final year of study, fishermen reported catching the equivalent of 180 to 250 percent of the estimated number of bass in the three catch-and-release lakes. This proves that bass can survive catch and release, and many are caught more than once.

The research data answered all our questions with an enthusiastic YES! Yes, angler acceptance of catch-and-release fishing at Tenoroc had been outstanding. Yes, no-harvest lakes clearly were preferred over areas that allowed some bass to be taken but were less productive. And yes, bass can survive handling and release and be "recycled" to help manage fisheries at quality levels.

The value of a catch-and-release largemouth-bass-fishing regulation has been proved at Tenoroc. As the population of bass anglers continues to grow, special harvest restrictions will become increasingly important to maintaining angler satisfaction. More and more bass fishermen appear willing to sacrifice harvest for quality fishing, and "catch-and-release" offers fisheries managers a regulatory alternative to optimize the use of a limited resource.

Phil Chapman is a fisheries biologist in the Commission's South regional office.

Fishing Tenoroc

By Lt. Rip Stalvey
Photographs by Phil Chapman

What becomes of a phosphate pit when they're through mining it? In Polk County you'll find a group of phosphate pits living a second life as a productive bass fishery.

Located between Lakeland and Interstate 4, Tenoroc Fish Management Area is a series of reclaimed phosphate pits managed by the Game and Fresh Water Fish Commission to offer anglers convenient, quality fishing. The Commission uses Tenoroc to test a concept known as "management by regulation."

Currently, nine bodies of water are open for public fishing. Each lake is governed by a different set of regulations. One lake's regulations may prohibit the use of outboard motors; another lake may be open to bank fishing only, while others require fishermen to release their catch unharmed. On one lake, anglers may use only artificial lures to catch fish. All fishermen must fill out creel sheets to assist biologists with data collection for determining the success of each management technique. The regulations were geared toward largemouth bass fishing, but Tenoroc offers excellent bream fishing opportunities as well.

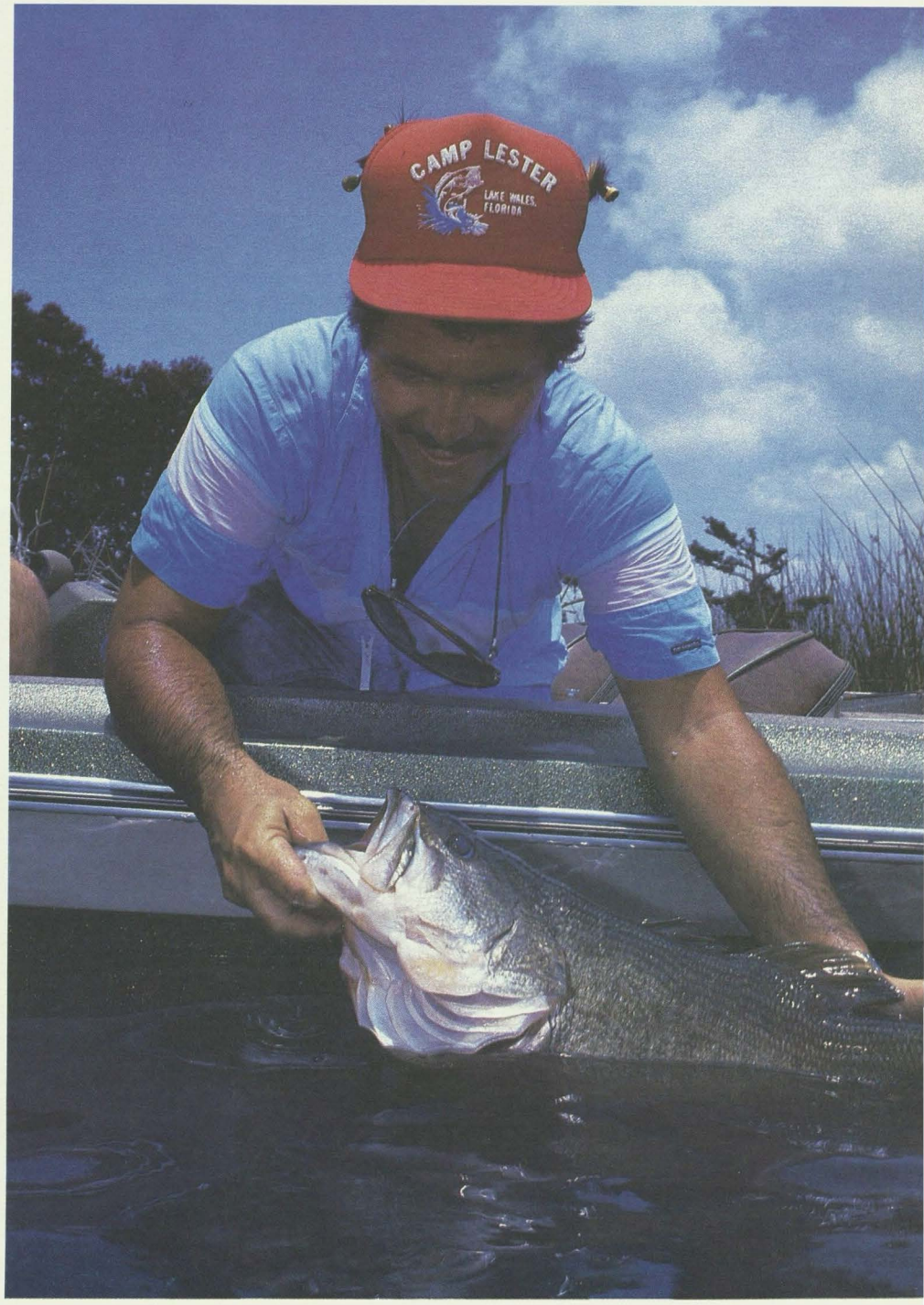
If you have fished phosphate pits for largemouth bass before, you already have a good idea of the fishing techniques that produce results. If you're a first-timer, here's some insight from anglers who fish the various lakes at Tenoroc regularly.

Springtime can be very productive for bass fishing at Tenoroc. One local angler caught and released 72 bass in a single day's fishing! During periods of

good weather, look for bass to be holding tight in cover along the banks. If you can cast accurately into tight areas, try diving crankbaits. Early in the day, a fire tiger color pattern works best; later, when the fishing slows down, switch to a crayfish-patterned lure. Flipping 4-inch artificial worms or lizards can be another highly successful technique.

Cattails that offer a bit of shade and good cover are likely to hold fish. Look for big bass around clumps of willows that are leafing out, offering shade and cover. The ▷

Tenoroc is a series of reclaimed phosphate pits managed by the Commission to offer anglers quality fishing opportunities.



spring post-spawn period can be a tough time for boating bass. One angler in the know suggested using a quarter-ounce chrome-and-blue Rat-L-Trap lure to entice bass into biting.

During the summer months, bass, like people, prefer cooler temperatures. To cool off, bass will move into deeper water. If you locate underwater bars and ledges in seven to 12 feet of water, you'll probably find bass. The Commission has installed fish attractors in three lakes at Tenoroc. Lakes A and B each have two attractors; Lake C has one. These underwater clumps of artificial structure will attract and hold both bream and bass. Fish attractors are marked with buoys anchored at both ends of the structures.

When temperatures are up, a Heddon Tiny Torpedo cast parallel to the shoreline can be an effective producer. Willow leaf spinner baits produce well for other Tenoroc anglers. Artificial worms, when fished in open water, can be deadly on summertime largemouths. Expect bass at Tenoroc to stick to their summertime habits well into November.

Bass become more active when temperatures drop during the fall and winter months. Largemouths will begin to use the entire water column as water temperatures cool. Reclaimed phosphate pits provide plenty of vertical dropoffs. Look for bass near these areas. The same techniques that produced well during the spring months will be effective during these early pre-spawn periods, too.

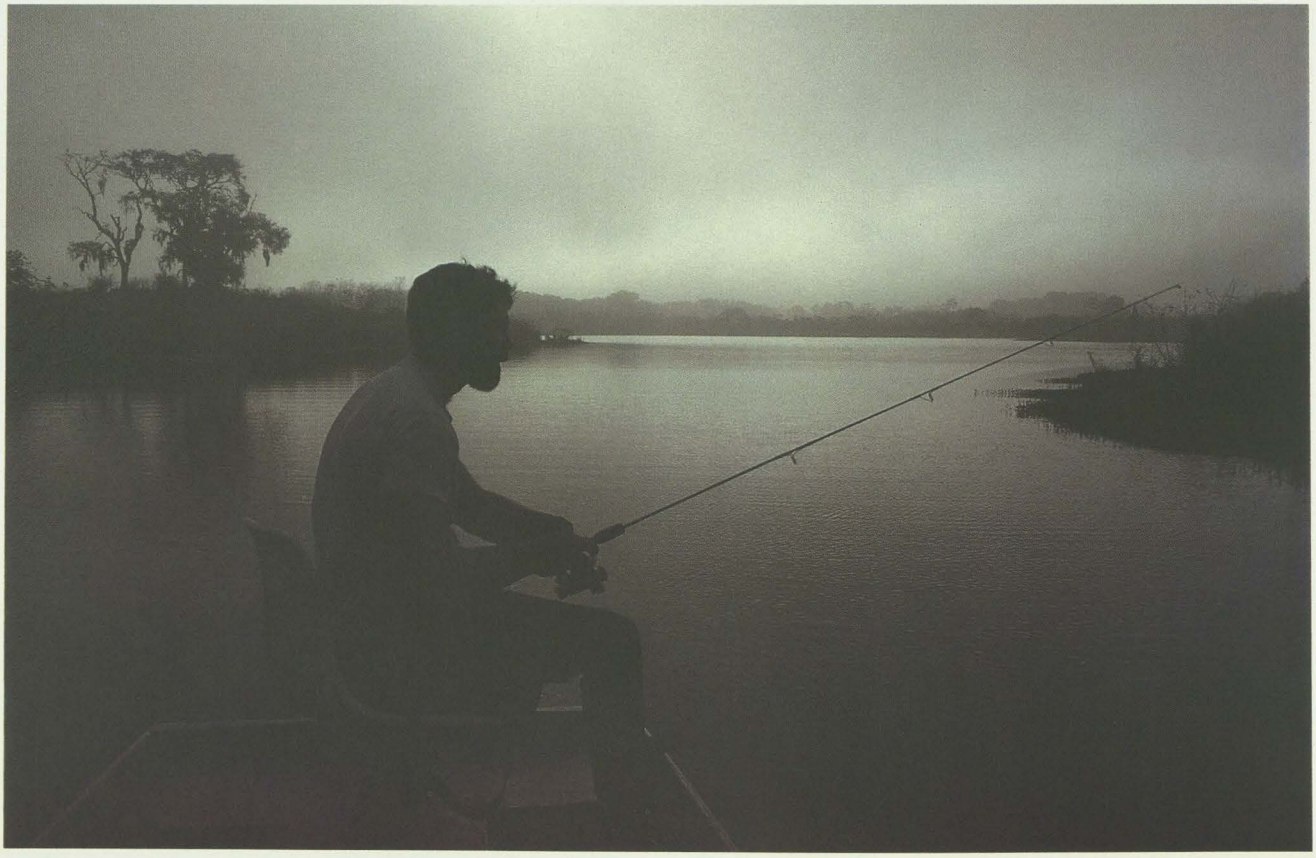
If you're a bream fishermen, Tenoroc can be a hotbed of activity. When these panfish are bedding, anglers harvest sizeable catches using live baits such as worms and crickets. Artificial lures such as beetlespins fished with ultralight tackle also produce consistent results. Springtime provides fast and furious black crappie fishing with Missouri minnows for bait.

How would you like to catch a state record fish? Tenoroc just might be the place to do so. The Commission has established a minimum weight of 2 pounds to set the state record for the yellow bullhead, also known as butter cat. To date, no one has claimed the record. Fisheries biologists have turned up yellow bullheads in excess of 2 pounds during sampling trips to Tenoroc. If you're out to set that state record, try chicken livers or commercial "stink baits" fished on the bottom.

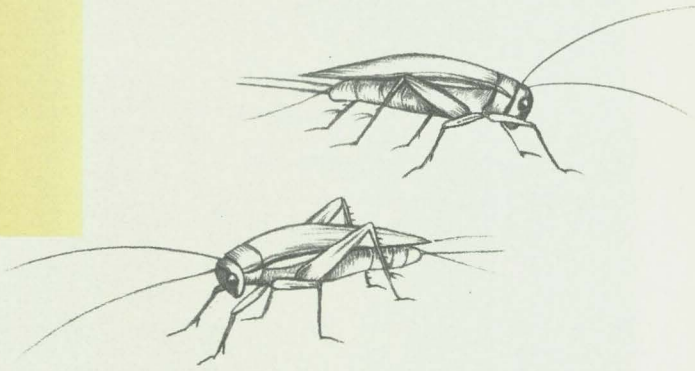
Tenoroc offers a wide variety of fishing opportunities. It's a place where fisheries management by regulation has paid off in a big way for Florida's anglers. If you enjoy quality fishing at its best, you owe it to yourself to wet a line at Tenoroc.

The area is open Thursdays through Sundays to a limited number of anglers on a first-come, first-served basis. You can reserve a spot by calling (813) 499-2421. Anglers may check in as early as 5:30 a.m., at which time they will swap their fishing license for a daily fishing permit and receive a brochure describing the lake's regulations. Anglers' licenses are returned when they check out.

Lt. Byron "Rip" Stalvey is the public information director in the Commission's Lakeland office.



Cricket Farming



By David Brown

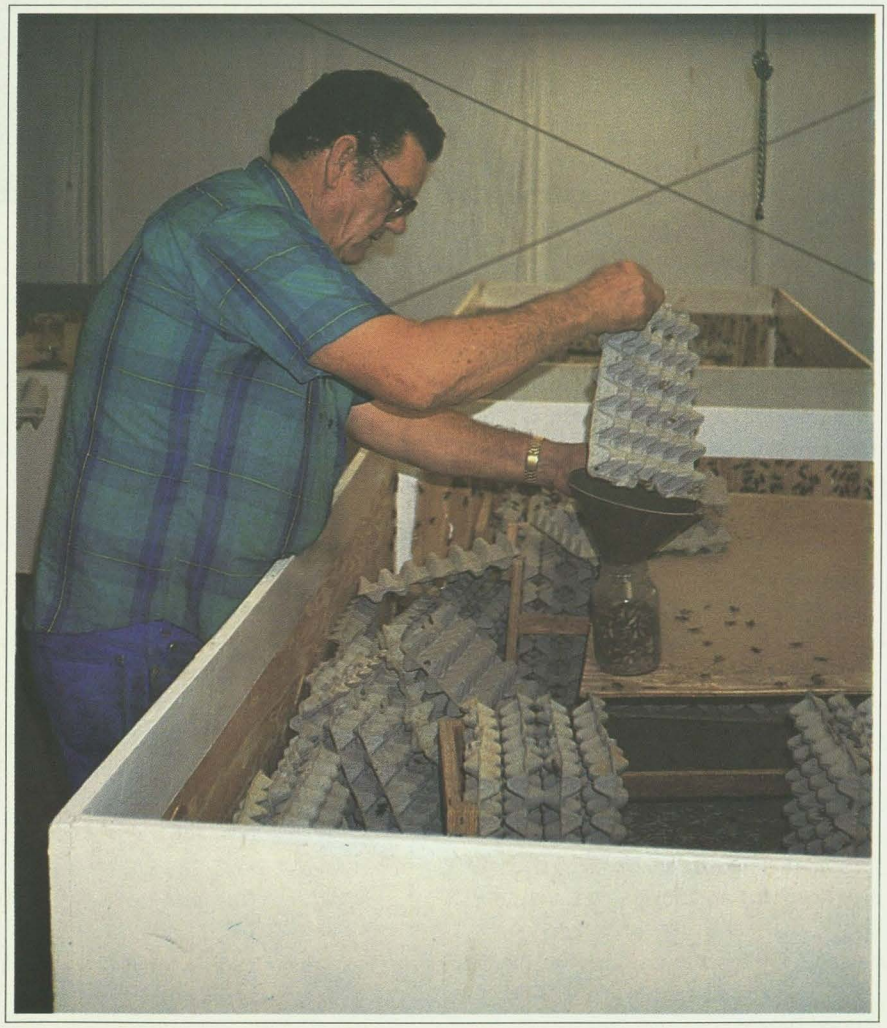
Business is really hopping for the Phillips family. Once cultivators of plump, red wiggler worms, the Lakeland clan presently is focusing attention on a more profitable enterprise: the domestic gray cricket.

"The price of crickets is higher than for other baits, like worms, because it costs more to raise them," said Lee Phillips. He, along with wife, Julia, and son Jim, owns Phillips Cricket Farm and Phillips Bait and Tackle, both in Lakeland.

"You can raise worms with very little outlay up front. But raising crickets requires a much more controlled environment, and the operation is more involved all the way around."

East Tampa cricket farmer Bill Thomas of Bill's Bait and Tackle agrees. He keeps his crop comfortable in "cricket motels" made of rectangular plywood bins complete with feeding pans, water bottles and cardboard egg trays for hiding.

In such accommodations, mature crickets will mate readily, with the females laying as many as 1,000 eggs in their 14-week life span. The young, which hatch as a miniature version of the adult insect, aren't much larger than a pencil point. But, after molting once weekly and munching on protein-enriched Purina Worm and Cricket Feed, they reach maturity in about seven weeks, eight in the winter. ▷



DAVID BROWN

Bill Thomas working his cricket farm.

DAVID BROWN

The important thing, Thomas said, is maintaining a constant cricket comfort zone of about 85 degrees. He's installed light bulbs in some of his bins. But it's not difficult to tell when it's time to crank up the heaters spaced among the bins.

"You can watch crickets and tell that a cold front is starting to move in, because they start gathering around the light bulbs," Thomas said.

Equally important, he added, is protecting the chirping crop from opportunistic predators. Ants are the worst. But he discourages the climbing intruders by placing the legs of each bin in cans filled with oil.

Also, wire mesh lids placed over the bins keep restless crickets from jumping ship. Occasionally one or two get out, but escapees rarely go to waste.

"I have some of the fattest lizards around here you've ever laid eyes on," Thomas said.

Crickets not only make good bait for panfish anglers, they're food for pet snakes and other critters.

There's demand aplenty for the survivors. Crickets long have been a mainstay for cane polers in search of bluegill, shellcracker and the like. But surprisingly, Thomas and the Phillipses agree, at least half of their business never hits the water.

For although Jim Stafford may not like spiders and snakes, there are plenty of others who do, and their beloved critters gobble crickets as fast as any panfish. Pet stores and other clients purchase several million a year, Jim Phillips said.

Lee Phillips attributes this popularity to the cricket's low maintenance and nutritional value.

"Once a cricket is grown, it's easy to take care of," he said. "Also, they're a high source of protein, and most animals can eat and digest them at an early age."

Thomas, who has spent most of his 10 years in the bait business raising crickets, has chosen to keep his operation

GABE THOMAS

It takes 7-8 weeks for a cricket to go from egg to fish hook.

within state boundaries. However, the Phillips family ships crickets as far north as Canada.

Phillips said he limits his distribution to areas east of the Mississippi in order to maintain a two-day delivery schedule. Destinations west of the river usually take three days, and that's too long to leave crickets unattended, he said.

Jim said standard cricket road-care procedures include clean boxes, plenty of breathing room and a few chunks of raw potato for nourishment.

"Once you guarantee delivery like we do, you have to be reliable or you'll be broke," he said.

Obviously, reputation is not a problem for the Phillipses. Jim, who manages the family cricket operation, said he has even fielded inquiries from overseas, but this presents yet another problem. He's found that the high-altitude flight patterns of most transcontinental cargo planes puts unbearable pressure on the crickets. And as he pointed out, a box full of mashed bugs isn't worth much to anyone.

But live ones are. And the value isn't limited to a one-time transaction, for these prolific orthopterans even yield a useful byproduct: cricket droppings. This potent stuff is so nutrient-rich, Jim bragged, "it will grow grass on a rock."

He used to package his supply and sell it for fertilizer. But the profit margin wasn't worth holding his breath that long, and now he just gives the stuff away to folks willing to pack it themselves.

Thomas mixes the droppings with excess feed to form a compost in which female crickets deposit their eggs. This mixture also can be used to fertilize worm beds, he said.

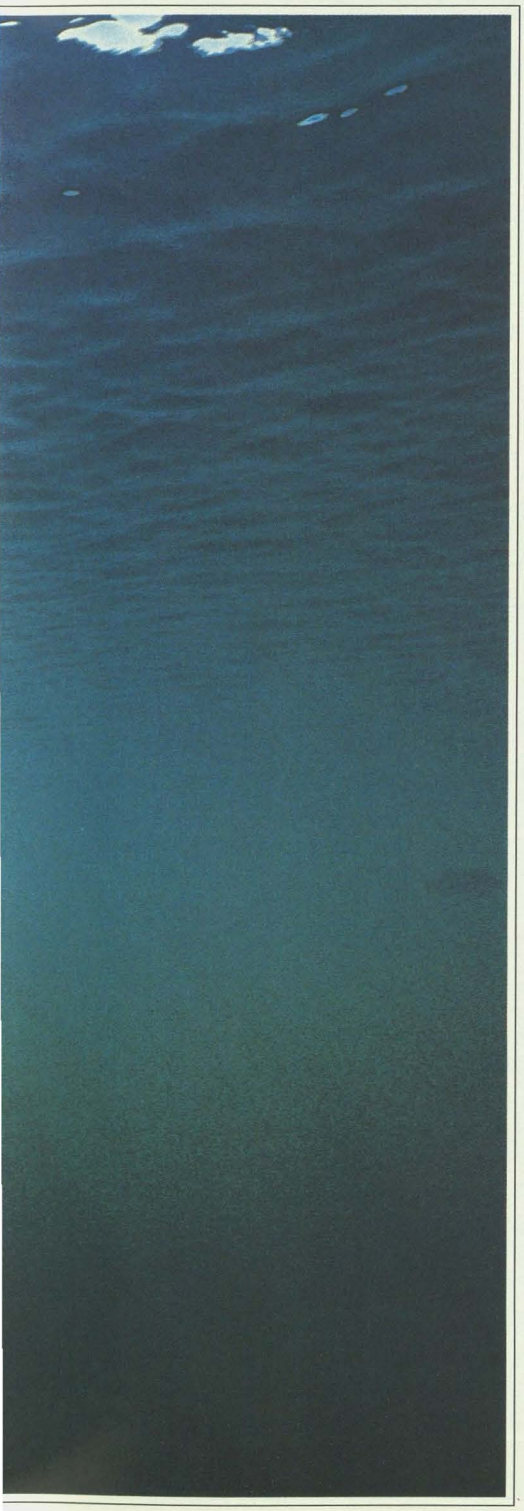
Still, Phillips said, the cricket business isn't for everyone. For although Florida's subtropical climate is ideal for raising crickets, getting these insects from egg to adult requires constant attention.

"It's seven days a week, just like farming," he said. "You have to learn to let your eyes, your ears, your nose and your fingers tell you what's going on. You have to be in there with the crickets to get a feel for them. Just like any other animals you raise, you have to give them good groceries and good care."

Phillips Cricket Farm can be reached at (813) 665-2074. Bill's Bait and Tackle is at (813) 621-4237.

David Brown is a free-lance writer and sports editor for the ***Tampa Tribune****. Fishing and writing about it are his main hobbies.*

In Search Of
QUIET WATERS



By Cheryl Buckingham
Photographs by Patrick Hagan

Two noses – one large, one small – broke the water's surface. The manatee cow took a breath and sank out of sight. The calf, just hours old, hovered uncertainly on the surface, its eyes wide, then it too disappeared. A few minutes later the cow reappeared, the calf balanced on her back. She lifted it to breathe, then submerged again. A manatee calf must quickly master the arts of buoyancy and surfacing to breathe before it can nurse underwater. In those first few days, the two need seclusion and quiet, both increasingly rare in Florida.

We had rushed to the scene in response to a call from the Manatee Hotline. A seemingly injured manatee, in a pool of blood, had been spotted in a dead-end canal behind a restaurant in New Port Richey. Prepared for the worst, we were delighted to discover that the blood was afterbirth and that in fact, Florida's newest manatee was doing quite well.

The restaurant owners were excited. They named the calf "Baby Louie" and shot roll upon roll of film. Small crowds formed. The media began to arrive. My companions, Patrick Hagan, then-manager of the Chassahowitzka National Wildlife Refuge, and Larry Hartis, the refuge biologist, answered questions and cautioned everyone to stay back and watch from a distance as the cow introduced her calf to the world.

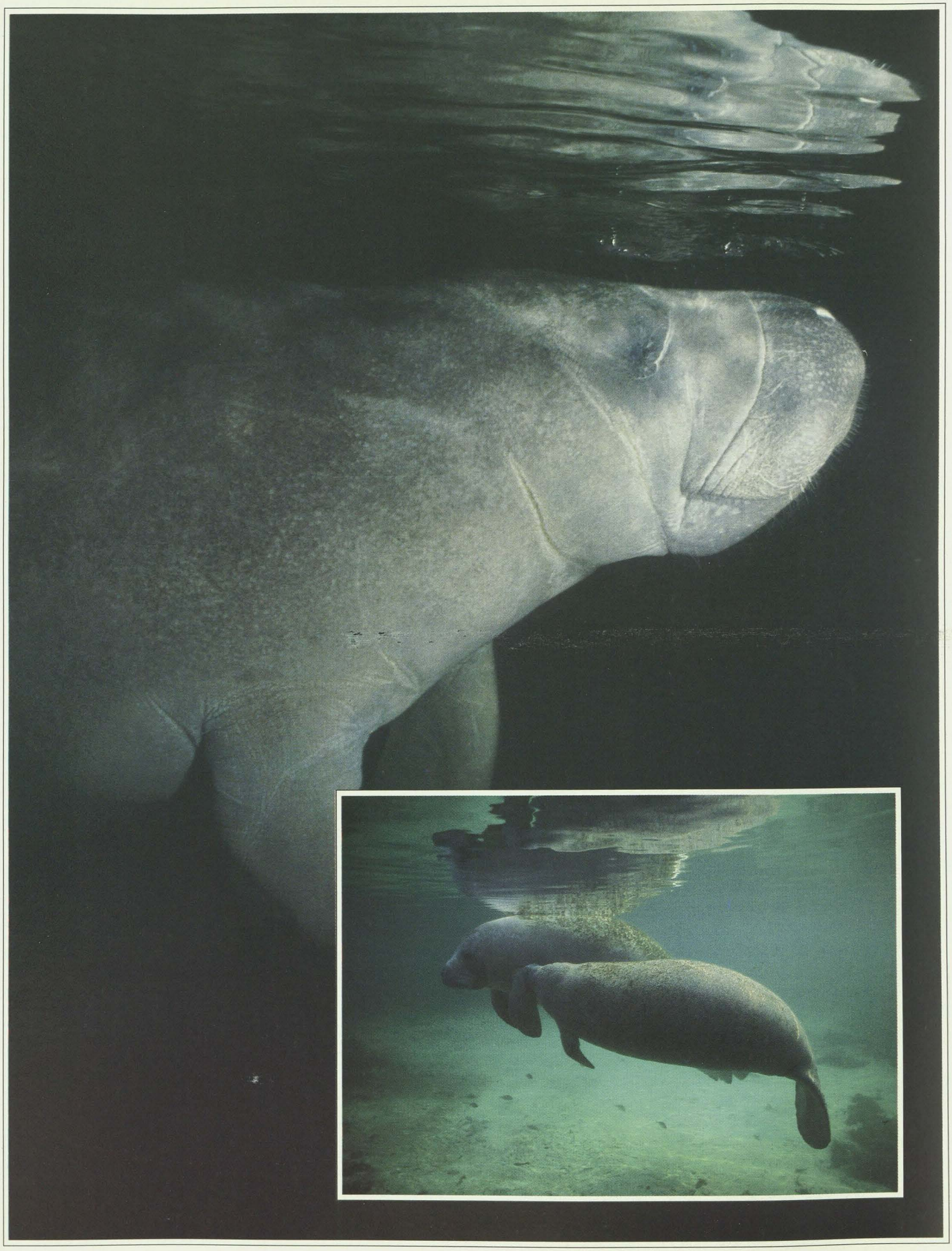
Manatees prefer to calve in shallow, hidden backwaters, so it is unusual for anyone to witness a birth in the wild. Unfortunately, as coastal inhabitants and boaters increase in Florida, these quiet nurseries are being invaded. The irony is that the people who search the hardest for quiet, secluded spots for themselves are most likely to become the invaders. We fill these once-remote spots with boats, fishing tackle and noise. A pregnant manatee likely will move to another place rather than risk notice.

In her quiet place, the manatee cow will give birth to a single calf or, occasionally, twins. She will assist her calf in its first breaths by lifting it to the surface on her back. Over the next day or two, the calf will learn to breathe on its own, and the two will surface nose-to-nose.

For the first few days, the calf swims awkwardly, using only its flippers. The cow stays near her calf as it clumsily searches for the nipples at the base of her flippers. It takes the cow's constant attention to get her calf through this crucial period. Any disturbance that separates a cow and her calf for even a few moments leads to a duet of *eek eek* distress calls as they search for each other. The danger is very real. If they are separated and not promptly reunited, the calf can drown or starve.

In manatees, as with most mammals, death takes its highest toll on the very young. About one-third of newly born calves die of unknown causes just before or after birth. Researchers suspect some of these fatalities could be attributed to disturbance or separation, but there is no way yet to prove it.

Within a few days, the two will swim to nearby grass beds, where the mother can feed for the first time since giving birth. She must swim slowly with her newborn calf, since the risk of separation is greatest now. They may be entering less protected waters and likely will encounter swiftly moving boats for the first time. ▷



The manatee's eyesight is poor, and many rivers are dark with tannic acid. If they lose each other, it might be forever.

Calves remain within vocal range of their mothers for up to two years, although they are born with developed teeth and begin to nibble on vegetation at around one month. The mother will try to herd her youngster away from danger with gentle nudges, but will not threaten an intruder. A manatee's only protective actions are to place herself between her calf and potential danger, or to flee.

Florida's manatees constitute the northernmost population of the West Indian manatee. Like their relatives in Central America and throughout the Caribbean islands, our manatees frequent freshwater rivers and sea grass beds in the shallow waters just off shore. But Florida is different; winters are colder here. Manatees must rely on springs and warm-water discharges from power plants to survive cold weather. Manatee calves are even more susceptible to the effects of the cold than are adults, with thinner fat layers and a proportionately larger surface area, so they lose heat quickly.

In Florida, the intrusion of people, especially those with powerboats, is increasing rapidly. These two factors combine to make the survival of manatee calves in Florida a risky business.

Since the late 1800s, people occasionally have happened upon new mothers and calves, but until the early 1980s, there was no official record of anyone witnessing a live birth. Today, because there are more manatee watchers, there are more sightings. Many recent sightings, however, are in urban areas. Some calves, such as Baby Louie, are being born in dead-end canals where they can be easily seen, and just as easily disturbed. Since more canals are being dredged each year, sometimes replacing natural habitat, more reports of manatees using them are likely.

Unfortunately, the main thrust of development in Florida is along our waterfronts. Construction along major rivers means that banks are seawalled, docks and boat ramps are built, shallow areas are dredged and boats invade the waterways. The natural grass beds, once rich sources of forage for manatees and other wildlife species, may be destroyed outright by construction or its aftermath. If they survive, the grasses may be contaminated by petroleum from boat motors and the deadly runoff from lawn chemicals.

Today, potential manatee nurseries are easily accessible to boaters seeking a quiet place to fish. We can protect manatee-aggregation spots with idle-speed zones and sanctuaries, but it's difficult to locate, much less protect, those occasionally used nursery areas. Yet, the mere presence of a single boat in a nursery can frighten a manatee. Manatees have sensitive hearing and are affected by sounds in and out of the water. Researchers have observed manatees wincing and diving in response to a small plane passing overhead. They will jackknife and panic when startled by a small boat if it moves quickly or noisily.

In a main river channel, where the water is deeper, a slow boat may pass overhead relatively unnoticed. Therefore, boaters get the impression that manatees aren't bothered by the vessel or can escape easily. Unfortunately, manatees spend most of their time in water less than 10 feet deep, where it's difficult for the slow-moving mammals to avoid a boat, especially a fast boat. Cows and calves can be injured by propellers or become startled, then separated from each other. Manatees with propeller scars are a sad but common sight.

The calf that survives its first few months will stay with its mother for up to two years. Researchers believe calves learn customary migration patterns from their mothers and other manatees. Without this experience, a newly independent youngster could find itself too far from warm water during a cold snap and die.

Once a calf is independent of its mother, it is called a juvenile. It may not reach sexual maturity for another three or more years, although it will mimic mating behavior in play. Young bulls become excited in the presence of a mating herd, but until they mature, they are easily distracted, unlike the adult bulls, whose persistence is legendary.

When the calf comes of age, it will begin to join other manatees in mating herds. Usually consisting of one female and a dozen or so males of all ages and sizes, mating herds can be seen roiling the waters of Kings Bay, Blue Springs and other traditional wintering spots in early spring. Whenever the cow is in motion, the males pursue her relentlessly. When she rests, they rest alongside her, often facing the same direction and burying their faces in the sediment. Several males mouth her back, nibble at her underside and try to jockey for position all at once. The most persistent, or the luckiest, succeeds in grasping her with his flippers and rolling underneath her, where they mate belly to belly. This scene is repeated over and over, and at times the activity is frenzied. Wakes from the tails of large bulls erupt every few minutes as they try to thrust themselves between their rivals and the cow.

Competition for a female is the only time the usually calm manatees become openly excited. Frustrated males may break off from the group to pester non-receptive females or even each other. Often the cow tires of the excitement and plunges deep into vegetation or thrusts herself into the shallows where she is less vulnerable to the males, but risks becoming stranded on the bank.

Mating herds can last for a month, involving every male in the area at one time or another. The herds seem oblivious to human presence at first, but careful observation reveals that their tumbling and thrashing is subdued when people are nearby.

If mating is successful, a calf will be born about 12 months later. If enough secluded areas remain for manatee calves to get a good start in life, this endangered, gentle species may be able to thrive, despite human encroachment.

Baby Louie was not so fortunate. The day after he was born, a television station sent a boat and camera crew to film Louie and his mother. The boat circled over them repeatedly, despite shouted warnings from the crowd and the restaurant owners. Before authorities could arrive, the frightened cow and calf were driven out into the Gulf of Mexico. Although the Marine Patrol and the Chassahowitzka Refuge staff searched for them, the two were never seen again.

Cheryl Buckingham is the assistant manatee coordinator for the U.S. Fish and Wildlife Service.

The Evolution of Florida's Wildlife

Law Enforcement

"With fairness to all and favors to none, the field force of the Department has made a fearless effort to secure law enforcement."

– excerpt from 1930 Department of Game and Fresh Water Fish Biennial Report

By Celeste Gutierrez-Sanders

Protection of Florida's fish and wildlife has been a convoluted process. Although our forerunners recognized the need to safeguard the state's natural resources in the early 1800s, they couldn't agree on how to do it. It wasn't until 1897 that the first fish and game law enforcement officers were hired.

The early game warden was characterized as a likeable, easy-going fellow. He knew his way around the woods, knew where the deer were feeding and the fish biting, and knew the people who lived in his territory. When he wasn't riding his horse on patrol along the river bank or forest, he could be found tending his farm or socializing.

In those days, the governor appointed game wardens. They served four-year terms and were paid $2 a day. Employment often depended on "who you knew" rather than experience. Thus, keeping the favor of the locals often conflicted with enforcing the state's game laws.

At the turn of the century, resident hunters and anglers were more often concerned about "outsiders" than they were about wildlife conservation. With such an attitude, it's not surprising that many of the early game laws favored local interests rather than protected resources. In fact, the disparity in game and fishing laws from county to county led the Legislature to repeal all local laws in 1927.

Unfortunately, the lack of a consensus about how best to manage the state's fish and wildlife resources prevented the establishment of a truly effective, statewide law enforcement program. It wasn't until the Game and Fresh Water Fish Commission was created in 1943 that the effort to standardize the state's fish and wildlife laws succeeded.

For the Division of Law Enforcement, the mid-to-late 1940s was a period of great change. Along with an increase in the number of wildlife officers, the Division took steps to professionalize its staff. Standards were established. Recruits had to be between 21 and 45 years old, physically fit, high school graduates and of good moral character. A training school was established in the late 1940s, and by the end of 1952, Florida's wildlife law enforcement program was one of the most progressive in the nation.

A dramatic shift in societal attitude shaped law enforcement activities in the 1950s and '60s. This period of "lost innocence" in America was also the beginning of a period of heightened environmental consciousness. There was a growing concern for all fish and wildlife, not just game species. In the following two decades, wildlife officers would become responsible for enforcing a plethora of regulations involving non-game animals and threatened and endangered species.

In the 1960s, the Division took on new responsibilities. An increase in boating traffic prompted the creation of water patrol units on the upper and lower St. Johns River, Kissimmee River and Lake Okeechobee.

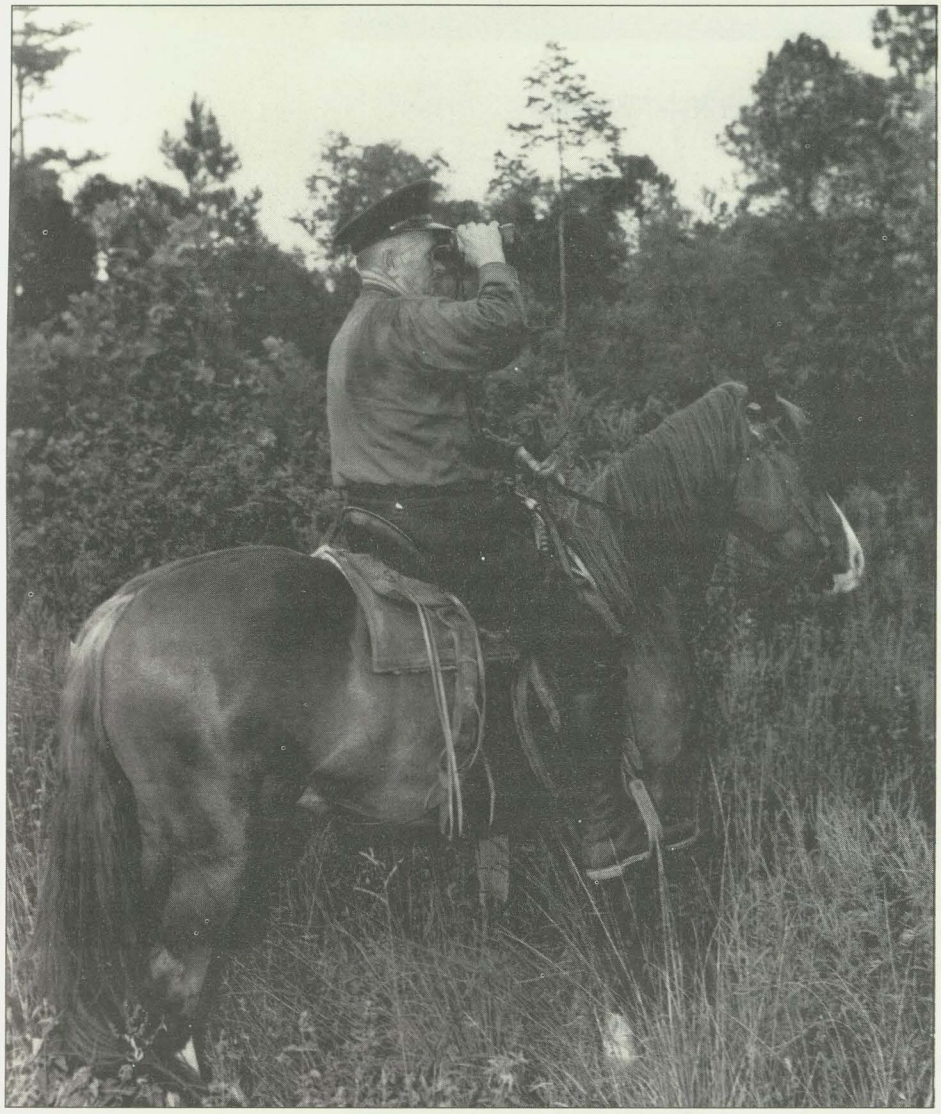
" Their primary enforcement duties included resource protection and boating safety," said Inspector Neil Branch, bureau chief of Training and Records. "Boating safety includes checks for safety equipment, search and rescue, enforcing regulations on congested waterways and investigating boating accidents."

The expansion was a logical extension of enforcement powers, since the Commission already was patrolling the state's rivers and lakes.

Wildlife officers received full state-police powers in 1970. They were empowered to make arrests for violations of all state laws, not just wildlife regulations. In that decade, they were called upon to assume duties that traditionally had been relegated to other law enforcement officers. Wildlife officers took part in quelling college campus disturbances that erupted during the Vietnam War. They assisted in the evacuation, search and rescue of victims of Hurricane Agnes. They also assisted other law enforcement agencies with security at the national Republican and Democrat conventions held in Miami Beach in 1972.

The following year, because of a steady increase of complaints about unsanitary and inhumane conditions at state wildlife attractions, a new law enforcement section was created. The Inspections Section was charged with not only inspecting wildlife exhibits, but regulating the importation and exportation of fish and wildlife. The sale of exotic animals and ornamental fish was, and still is, a multi-million dollar business in Florida.

The Division encountered a new challenge in the late 1970s – the energy crunch. Rising fuel prices drove the Commission to consider smaller, more



Wildlife Officer Joe Atkins on horseback patrol, circa 1940s. GFC

fuel-efficient patrol vehicles, even trail motorcycles. The motorcycles served as supplemental vehicles. Generally, they were transported to an area by automobile and then used for patrol. Although special motorcycle training was provided, the bikes proved unpopular, especially to those who had taken a spill or two.

The Division of Law Enforcement hired its first female wildlife officer in 1975. Since that time, women have been incorporated into the work force and have risen through the ranks.

The Wildlife Alert Reward Program, with a toll-free telephone hotline, was created in 1979. Its purpose was to increase citizen participation in apprehending violators of fish and wildlife laws.

"Many people have called Wildlife Alert with tips that have led to arrests," said Inspector Kyle Hill, bureau chief of Support Services. "Most people who report violations don't want a reward. They just want the violators caught."

In the 1980s Florida began feeling a budget crunch that was to continue into the '90s. The Legislature, in attempts to reduce overall spending, cut agency budgets, and the Commission had to devise ways of doing more with less. In contrast, the '80s were good to the Division of Law Enforcement. Law enforcement was enhanced with the addition of more officers and equipment.

In 1989, law enforcement took a new direction. Realization that the dumping of toxic waste and materials often posed a more deadly and long-term threat to fish and wildlife than poachers led to the creation of an environmental enforcement section within the Bureau of Operations and Investigations.

"We realized that unless we stopped the destruction of the habitats on which fish and wildlife depend, there would be no fish or game to protect or manage," remarked Col. Robert Edwards, director of the Division of Law Enforcement.

Officers assigned to this section have received extensive training in environmental enforcement.

The Division entered the information age in the early 1990s. Wildlife inspectors were issued cellular phones, regional office computers were acquired and equipped with modems, and a network was created, along with computerized programs, to track daily activities, arrests, complaints and the budget.

The 1990s brought another new program. Field officers began using dogs to sniff out contraband guns and game. Canines trained to detect wildlife can locate game in vehicles and vessels quickly, and also are good at finding hidden firearms.

"A lot of cases that otherwise wouldn't have been made for lack of evidence have been successfully prosecuted after 'missing' firearms and such were retrieved by the dogs," said Mike Fischer, K-9 trainer.

As the Commission progresses through the 1990s and into the 21st century, the Division of Law Enforcement will face many new challenges, expectations and demands for services. Three areas that have been identified for priority consideration are traditional resource enforcement, boating safety enforcement and environmental enforcement.

"Just as the Division has adapted to the changing conditions of the past, it will continue to do so in the future in order to provide the highest possible level of service to the citizens of Florida," Edwards said.

Celeste Gutierrez-Sanders is a public information specialist in the Commission's Tallahassee office.

It's The Law

By Inspector Kyle W. Hill

Question: I found a dead owl on the highway. Can I have it mounted?

Answer: No. Federal and state laws protect nearly all birds as "migratory birds."

Technically, it is against the law to possess even a feather or any other part of a nongame migratory bird without state and federal permits. This is to prohibit individuals from killing such birds for the purpose of using their feathers or mounted bodies as decoration in their homes. Persons finding road-killed birds may donate them to schools, colleges or universities, and that institution may apply to the Game and Fresh Water Fish Commission for a permit to have the bird mounted for educational display. Permits are not issued to private individuals wishing to mount nongame birds for display in their home.

Birds not classified as migratory birds include quail and wild turkey (resident game birds), and English sparrow, starling, pigeon and Muscovy duck (exotic species).

Question: My child found a baby bird. Is it legal to keep it?

Answer: Again, migratory birds, regardless of age, are protected and may not be possessed by unauthorized individuals.

It is difficult to raise baby birds successfully. Some species, like blue jays, mockingbirds and cardinals must be fed every 20 minutes! Tiny sparrows should be fed every 10 minutes! Therefore, it's probably best to leave the bird in the wild, unless a free-roaming pet poses an immediate danger.

Before taking possession of a baby bird, make certain it is an orphan. The parent may be some distance away watching its offspring. If the bird has fallen from the nest and is not hopping around or trying to fly, place it back into the nest if possible. Birds cannot "smell" humans, and parent birds *do not* automatically reject a baby bird handled by a human.

If you find a young or injured bird in imminent danger, take it to a permitted wildlife rehabilitation center for professional care as soon as possible. There are over 275 such facilities statewide whose operators are permitted by the Commission and the U.S. Fish and Wildlife Service. To find the nearest rehabilitation center, contact the closest Commission regional office, listed on page 48.

GFC

By Lieutenant Jill Simmons

Nearly everyone enjoys watching wildlife. However, many have trouble locating animals to watch. With just a little study and practice, you can greatly improve your chances of seeing wildlife when afield.

One of the most important things to learn is which animals occur in Florida's diverse habitat types. Some species may be found in several different habitats, while others occur only in one, very specific habitat. Many popular books describe Florida's different habitats as well as species you may expect to find in each.

Learning to identify animal sign can provide valuable clues to the whereabouts of wildlife. Tracks tell you what animals are in a given area and can also tip you off to their movement patterns and direction of travel. Sign that animals leave as they feed can provide additional clues. For example, gnawed nut shells indicate that squirrels are using a particular tree as a food source.

But locating wildlife is just half the problem. How can you get close enough for a good look? Overcoming a wild animal's sense of sight, hearing or smell without being detected is a real challenge. When you're in the woods, you're in the animal's own backyard – on its turf. Wild animals are acutely aware of what's going on around them. It's possible to approach wildlife closely but only if you practice and develop some outdoor skills. Observers should remember that wildlife is especially vulnerable when nesting or rearing young, and should avoid disturbing animals with offspring.

To overcome a wild creature's sense of sight, you can try several different tactics. Concealing yourself in a camouflaged blind and waiting for animals to come to you is one alternative. When looking for deer, sitting quietly in a tree stand, above the animal's normal line of sight, can bring results. Or perhaps completely camouflaging yourself and slipping silently through the woods is your method. But remember, if you're a deer hunter you must wear 500 square inches of blaze orange while hunting on public lands. Although not required for hunters pursuing other species, it is nonetheless an excellent idea.

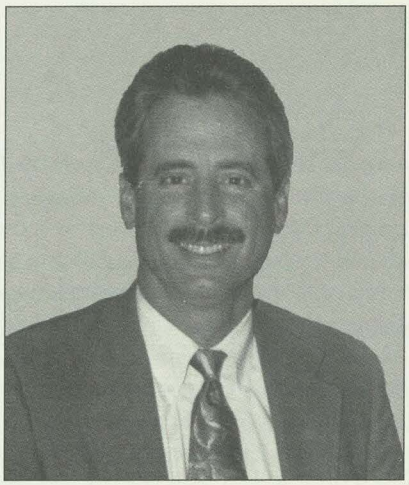
Many animals have a finely tuned sense of hearing. The clothes you wear and the way you walk can blare out your presence to wary animals. Many clothes are made of synthetic materials, and when twigs and branches brush against them, they make a surprisingly loud sound. Wearing clothing of natural materials such as cotton or wool will help minimize such noises.

Sounds made while walking can frighten animals. Years of walking on hard, smooth surfaces such as floors and sidewalks make for clumsy movement on the uneven terrain encountered in the field. There are two ways to move more silently. First, completely change the manner in which you take your steps. People normally walk by stepping first on the heel and then the toe. Try coming down on the ball of your foot first and then bringing down your heel. You'll be surprised how quiet this method of walking is. Secondly, wear soft, thin soled shoes such as moccasins, weather permitting. You will be able to "feel" any twigs or branches before they snap.

Overcoming an animal's sense of smell can be a real problem. There are basically two things you can do. Try staying downwind as you approach the animal so the breeze won't carry your scent toward it. But keep in mind – the wind is often fickle and can change in an instant, blowing your scent toward the animal and causing it to flee. You might want to consider masking your scent with a substance that covers or hides human odor. There are many different types on the market to choose from. Just make sure that the scent you select is familiar to the animal you're pursuing and that it doesn't smell like something foreign. For example, though northern deer are familiar with apples and associate their smell with something good to eat, Florida deer have no idea what apples are.

By learning how wild animals function in their daily lives and by sharpening your outdoor skills, you can greatly improve your ability to locate and see wildlife. You might want to consider taking the Commission's free hunter education course to receive more tips. For information on the next class in your area, contact the hunter education officer at your nearest Commission office.

Compiled by Scott Ball



BILL BURGIN

DARDEN IS NEW OIS DIRECTOR

Commission executive director Col. Robert M. Brantly recently announced the appointment of Woody Darden to head the agency's Office of Informational Services (OIS). Darden moves up from the assistant director's position, which he held since joining the Commission in 1981.

OIS is responsible for conveying information to the general public regarding the Commission's programs and activities. It also administers several informational and educational programs, including Project WILD, Nongame Wildlife Education and production of FLORIDA WILDLIFE.

Darden will fill the position vacated by Dennis E. "Duke" Hammond, who now administers the Commission's participation in the Surface Water Improvement and Management Act through the Division of Wildlife.

COMMISSION REVAMPS GATOR HARVEST

Want to be an alligator trapper? Your chances of being selected for this September's statewide alligator harvest just got better.

"We've cut the bag limit to one third, so we can triple the number of trappers," said Tim O'Meara, of the Commission's Division of Wildlife.

The Commission will allow trappers to take a maximum of five or six alligators, instead of the 15-gator bag limit of previous years. Also, the September alligator season will be split into two phases. Half the trappers will hunt Sept. 1-15, and the other half will hunt Sept. 16-30. The Commission has set 33 possible harvest sites. The exact number of hunters allowed to participate will depend on the number of gators surveyed at each site.

Potential gator trappers may obtain applications from any Commission office. Those who requested applications last year will receive one automatically. Trappers will be selected at random from applications received by June 1.

STUDY: LAKE OKEECHOBEE IS HIGHLY EUTROPHIC

A study begun in 1987 to assess the overall health of Lake Okeechobee revealed an inordinate amount of pollution-tolerant invertebrates, evidence that Florida's largest lake is highly eutrophic – overloaded with nutrients.

Scientists discovered the worms, insects and crustaceans in a substantial portion of the lake's bottom. They believe the rise of these organisms signals that eutrophication is threatening the well-being of the 450,000-acre lake. The most abundant invertebrate collected during the study was a segmented worm known for its pollution tolerance and ability to withstand long periods without oxygen.

" The population of pollution-tolerant worm species has doubled during the past 20 years," said Commission fisheries biologist Gary Warren. "At the same time there has been a 50-percent decline among the more pollution-sensitive species."

Warren said if the problems are not confronted adequately today, the lake's degradation will continue to favor the types of less desirable plant and animal life that thrive in heavily degraded ecosystems.

Invertebrates reflect the condition of an aquatic ecosystem. They convert algae and other plant materials into protein for use throughout the food chain. Invertebrates also make up a large part of the diet of juvenile freshwater game fish.

ENTER FLORIDA DUCK, TURKEY STAMP CONTESTS

Each year in mid-June, the rules and regulations packets for the Florida Waterfowl and Florida Turkey Stamp design contests are mailed out. Contest rules and official entry forms are available from Tom Wright, Division of Wildlife, Game and Fresh Water Fish Commission, 620 S. Meridian St., Tallahassee, FL 32399-1600.

The winning entries will be selected in January. Hunters of the respective game must purchase the stamp in addition to their hunting license.

ART EDITOR DESIGNS NEW PANTHER TAG

Soon you'll be seeing a new version of an old license tag on some Florida automobiles.

The Florida panther license plate features a new look – created by FLORIDA WILDLIFE art editor, Peggy Perkerson. Her design was selected by Sen. George Kirkpatrick, who sponsored a bill, approved by the 1993 Florida Legislature, to change the appearance of the tag.

The tags cost $27 more than regular license tags, but 50 percent of the added amount goes to the Florida Panther Research and Management Trust Fund administered by the Game and Fresh Water Fish Commission. The remainder is divided between the Save Our State Environmental Education Trust Fund in the Department of Natural Resources and the Florida Communities Trust Fund in the Department of Community Affairs and is used for education and habitat protection, respectively.

The new panther plates should be available May 15.

COMMISSION REVISES FISHING REGULATIONS, HUNTING ZONES

Striper and crappie fishermen should be aware of several rule changes recently passed by the Game and Fresh Water Fish Commission.

Beginning July 1, anglers in the Suwannee River and its tributaries and all waters north and west of the Suwannee will be limited to three striped bass longer than 18 inches. The aggregate bag limit of stripers, whites and sunshines in this area will remain at 20, as long as no more than three are stripers exceeding 18 inches. For waters south and east of the Suwannee River, the aggregate bag limit will continue to be 20 striped and sunshine bass, with only six exceeding 24 inches.

The Commission also set a 10-inch minimum length for black crappie (speckled perch) caught from Lake Talquin, effective July 1. All black crappie smaller than 10 inches in total length must be immediately released unharmed.

In addition, the Commission shifted the hunting boundary line between the Northwest and Central management zones. The line along U.S. 27 from Tallahassee to the Ochlockonee River to the Florida/Georgia border moves to follow S.R. 155 from Tallahassee to the state line.

ADOPT A MANATEE – FOR MOM

Here's a suggestion for anyone who wants to give a large gift for Mother's Day or for any other occasion – a manatee.

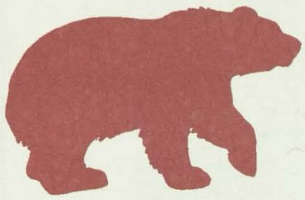
Okay, so she won't actually *receive* a manatee; they don't make good house pets anyway. What we had in mind was adopting a manatee in Mom's name.

For $15, Save the Manatee Club will send an adoption certificate, an underwater photo of "her" manatee, its life history and a subscription to Save the Manatee Club's newsletter. Funds generated this way will help expand state and federal research programs, provide manatee warning signs in Florida waterways, and produce state and national public service announcements.

To adopt a manatee for your mother, or for anyone else, send $15 to Save the Manatee Club, 500 N. Maitland Ave., Maitland, FL 32751.

"It may be a shopper's paradise, but I liked it better when it was a wetland."

Report Wildlife Law Violators and Polluters!



Wildlife Alert

CALL TOLL FREE

Panama City	1-800-342-1676
Lake City	1-800-342-8105
Ocala	1-800-342-9620
Lakeland	1-800-282-8002
West Palm Beach	1-800-432-2046

REGIONAL OFFICES
Florida Game & Fresh Water Fish Commission

Northwest Region
3911 Hwy. 2321
Panama City, FL 32409-1658
Telephone: (904) 265-3676

Northeast Region
Route 7, Box 440
Lake City, FL 32055-8713
Telephone: (904) 758-0525

Central Region
1239 S.W. 10th Street
Ocala, FL 34474-2797
Telephone: (904) 732-1225

South Region
3900 Drane Field Road
Lakeland, FL 33811-1299
Telephone: (813) 648-3203

Everglades Region
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Floridana

The Evolution of Communications

Imagine yourself in the middle of a remote swamp, miles away from "civilization." Any injury or emergency encountered in the wild can become life-threatening when there's no way to call for help.

Yet when the Commission was created in the 1940s, the agency didn't have a communications system. Once a wildlife officer went into the field he was truly "alone." He couldn't call anyone if he was in trouble and needed assistance. Nor could office staff notify him of situations requiring immediate attention.

The problem wasn't that communications technology was unavailable. Back then the Commission just didn't have enough money. It relied solely on license sales and arrest fees for funding, which wasn't sufficient to purchase a communications system with radio towers and dispatchers.

"When I came aboard in 1948, I designed and installed a low-band radio system," said Rhett McMillian, retired communications engineer. "The mobile-to-mobile car radio system allowed wildlife officers to talk to each other from across a river, providing their cars weren't too far from each other. But we still didn't have very much money, so we sometimes used trees for radio towers."

A few years later, the Commission was forced to disband its communications system.

"The Federal Communications Commission (FCC) took away our frequencies in the 1950s for reasons involving national security. They said the frequencies we used were dedicated to some radio system in Alaska that protected the country from Russian missiles. So, I had to redesign the whole thing," McMillian said.

The FCC action may have been a blessing in disguise because it allowed the Commission in 1957 to develop the nation's first statewide, automatic, mobile relay system. The new system used high-band radio, which had a range of 40 to 50 miles, and allowed the use of repeater stations, which in turn made it possible to communicate with officers from even greater distances.

The Commission also hired its first dispatchers to monitor the new system in the '50s. These dispatchers typically were housewives who listened to the radio scanner while they did their chores at home.

"The main thing we were after was telephone contact for the officers. The dispatchers could call whomever was needed," said Bill Barker, telecommunications administrator.

It wasn't until the late '70s, when the Commission moved its radio centers to its regional offices, that bona fide radio dispatchers were hired. These professional communications officers manned the dispatch center 24 hours a day, seven days a week.

"Today, every Commission law enforcement car, boat or plane is radio-equipped, making it possible to communicate with wildlife officers anywhere in the state," Barker said.

Tomorrow is even more promising. A sophisticated communications system is being developed that will unite the Commission with the Florida Department of Law Enforcement, the Division of Alcoholic Beverages and Tobacco, the Florida Marine Patrol and the Florida Highway Patrol. The new system will allow the Commission to communicate with any state, county or municipal law enforcement officer in the state to coordinate law enforcement activities better. It also will allow wildlife officers in the field to access both the state and national crime computer centers at the touch of a button.

– Celeste Gutierrez-Sanders